

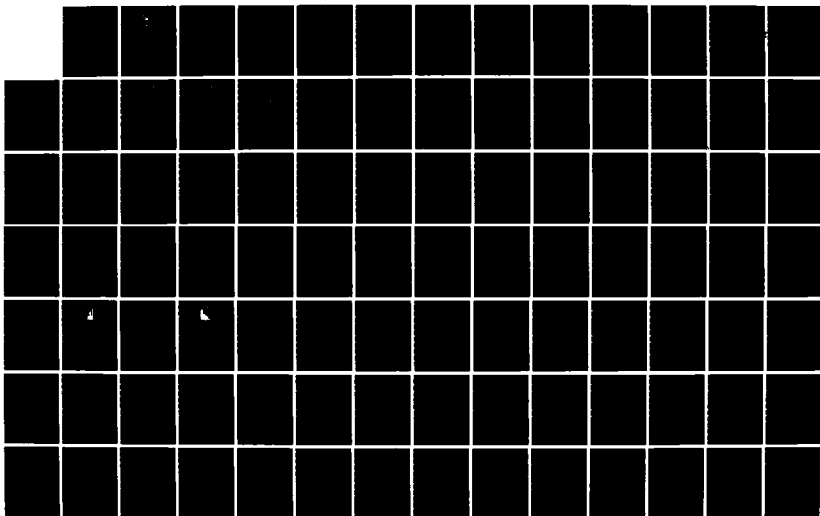
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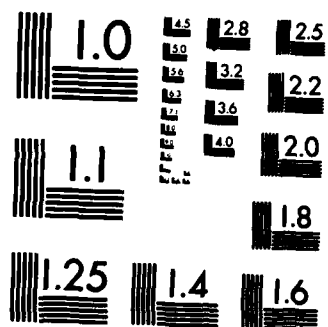
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MINUTEMAN MISSILE COMBAT CREW  
MEMBERS AS MAINTENANCE EXTENDERS

THESIS

Charles L. Burdsal  
Captain, USAF

AFIT/GLM/LSM/846-7

DEPARTMENT OF THE AIR FORCE  
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Wright-Patterson Air Force Base, Ohio

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ANALYSIS OF THE PROPOSED USE OF MINUTEMAN MISSILE  
COMBAT CREW MEMBERS AS MAINTENANCE EXTENDERS

THESIS

Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology  
Air University  
In Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Logistics Management

Charles L. Burdick, B.A.  
Captain, USAF

September 1984

Approved for public release; distribution unlimited

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Charles L. Burdall

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Abstract

This investigation determined the practicality of Minuteman Missile Combat Crew Members (MCCMs) performing maintenance in Minuteman Launch Control Centers (LCCs). The investigation was accomplished by an analysis of literature on MCCM maintenance performance, analysis of survey results, and analysis of maintenance data from the Minuteman wings. The survey solicited the attitudes and suggestions of Minuteman maintenance and operations personnel.

The survey results were stored on a data base system and cross-referenced by different categories to investigate specific hypotheses. A spreadsheet program determined category percentages and formatted tables. Hypotheses were supported or not supported based upon responses to specific survey questions by groups of respondents. The spreadsheet program was also used to compare and contrast the maintenance data from different Minuteman wings to determine the average annual number of maintenance actions that could be performed by MCCMs at each wing. The results of the survey responses and the maintenance data were used to determine the practicality of the idea.

The results indicate the performance of minor LCC maintenance by Minuteman MCCMs to be a practical use of manpower resources and suggests that the necessity for this utilization of MCCMs varies between the different Minuteman wings.

# ANALYSIS OF THE PROPOSED USE OF MINUTEMAN MISSILE COMBAT CREW MEMBERS AS MAINTENANCE EXTENDERS

## I. Introduction

### Definitions

AFSC. Acronym for Air Force Specialty Code. The AFSC was used to identify the job assignment of Air Force personnel, such as the MOS was used in the Army. For example, a Missile Combat Crew Commander had an 1825 AFSC, while a fully-qualified Missile Maintenance Officer possessed AFSC 3124. AFSCs had alphabetical prefixes and suffixes (examples: A1825, 3124G) which identified the holder as having a special assignment and/or special qualifications, or as working on a specific weapon system (examples: "B" suffix = "Minuteman III").

Alert. In 1984 a stint of duty, officially 24 hours but actually from 30-36 hours, served by missile combat crews in the Launch Control Center (see below). The time in excess of 24 hours was consumed travelling to and from the base to the LCC, relieving the crew on duty (Launch Control Centers were constantly manned), and briefing/debriefing on the base before and after the alert. Crews assigned to Strategic Missile Squadrons (see below) had from 6-9 alerts per month, while crews assigned to DOTI and DOV (see below) had from 0-5 alerts per month. Flight Commanders had 5-6 alerts per month. Since all crews were counted together for statistical purposes, a majority of crews could have 8 alerts per month while the "average" number of alerts per crew was 5-6 alerts. Going out on an alert was called "pulling alert".

Equipment racks and drawers. The Minuteman weapon system used the modular, or remove-and replace ("R&R") concept of maintenance. Briefly, under this concept electronic equipment was in drawers which were installed in racks, similar to file drawers in a file cabinet. Each drawer was connected to other drawers and other racks by means of connector plugs at the rear of each drawer which were connected to wiring bundles. The wiring bundles ran between the drawers inside the racks. Connection between racks was accomplished by cables running from the top of each rack. The wiring bundles inside each rack were connected to the cables via the same type of connector plugs as were used to connect drawers to wiring bundles. With the exception of power-supply drawers, for which power had to be removed from whole sets of racks, the removal procedure for a drawer involved: (a) removing power from the individual drawer if it had its own on-off switch or from the rack if it did not, (b) sliding the drawer out of the rack, (c) unscrewing the plug connectors at the rear of the drawer, (d) removing the drawer from the rack. The replacement procedure was essentially the reverse of the removal procedure: (a) remove any protective covers from the plug connectors on the rear of the drawer, (b) slide the drawer partway into the rack, (c) connect the wiring bundles from the rack to the correct connector plugs on the drawer, (d) slide the drawer the rest of the way into the rack, (e) lock the drawer handles into place, (f) re-apply power to the drawer. Often the only testing involved was to have the missile combat crew perform some checklist procedure that would involve operating the electronics contained in the drawer. If the drawer performed properly, the R&R procedure was completed.

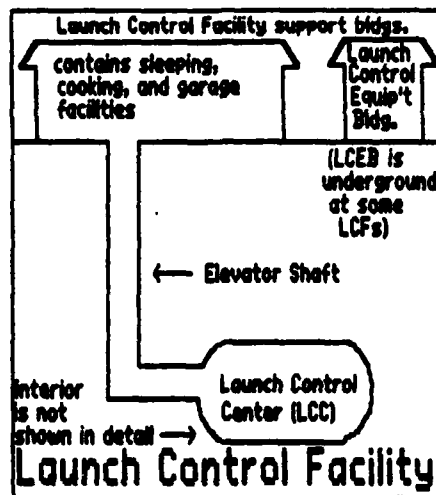


Figure 1. Simplified Diagram of Launch Control Facility

The removed, malfunctioning drawer was returned to the base for repair. Usually the repair took place on the base, although some drawers had to be sent to depots or contractors for more involved repairs. A drawer may also have needed parts that were unavailable on the base, in which case the drawer could not be repaired until the required parts were received via the supply system.

EWQ. Acronym for Emergency War Order(s). Used both as a noun and as an adjective to describe both the condition of constant war-readiness of ICBMs, LFs, and LCCs; and to label equipment and procedures associated with this readiness condition.

Launch Control Center (LCC). The manned underground "capsule" which contained the command and control equipment which monitored and controlled the ICBMs in the LFs. Actual internal layout and design of LCCs varied from wing to wing and sometimes within a wing (see Figure 1).

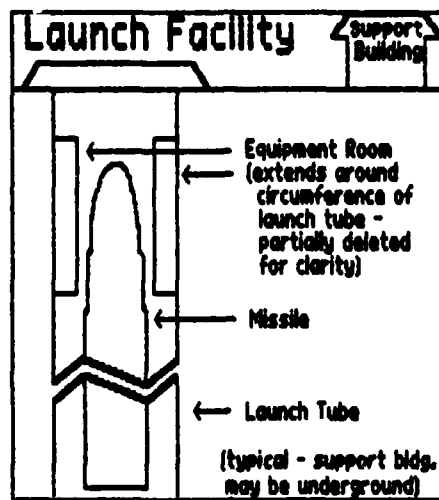


Figure 2. Simplified Diagram of Launch Facility

Launch Control Facility (LCF). (see Figure 1) The LCF consisted of the LCC and above-ground support buildings, including garages for Security Police vehicles, fuel tanks, and cooking and sleeping facilities. The above-ground portion of the LCF was permanently manned by Security Police and food service personnel, and by the Facility Manager (FM). The FM was an experienced NCO who functioned as "motel manager" and maintenance man for the LCF. The Security Police element, led by an NCO, was responsible for the physical security of the Missile Flight area.

Launch Facility (LF). (see Figure 2) The unmanned "missile silo" which contained one Minuteman intercontinental ballistic missile (ICBM). The LF included a Launcher Equipment Building (shed) which held a diesel engine for auxilliary power and environmental control equipment. The Launch Tube which held the missile was ringed at the upper levels by walkways which held racks of electronic equipment.

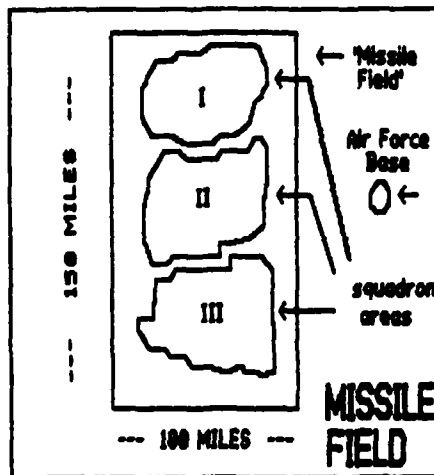


Figure 3. Simplified Diagram of a Missile Field

Missile Combat Crew Member (MCCM). Any individual who was a member of a two-man Missile Combat Crew (MCC). The crews consisted of a Missile Combat Crew Commander (MCCC) and a Deputy Missile Combat Crew Commander (DMCCC). MCCC's held AFSC 1825 while DMCCC's held AFSC 1823. After a certain amount of time (usually about 2 years) a DMCCC was usually "upgraded" to the position of MCCC. In 1984, MCCs "pulled alerts" (duty stints) for 24-hour periods in the LCC. This 24-hour alert period did not include time spent in briefing or debriefing at the base before and after an alert nor did it include changeover time, when the MCC on duty was being relieved by another MCC. It also did not include time driving to and from the LCF and the base, which could take up to several hours depending on distance and seasonal road conditions.

Missile Field. (see Figure 3) Consisted of the combined flight areas of the three or four SMS assigned to the SMW. Missile fields had no standard shape but were often in excess of 100 miles on a

side. The field contained 15-20 LCFs and 150-200 LFs, each several miles away from other LCFs or LFs.

Missile Flight. A missile flight consisted of one LCC and the ten LFs which that LCC controlled. For example, "Alpha" flight might consist of Alpha-Zero (the LCC) and Alpha-one (A01) through Alpha-ten (A10), the ten LFs. The Flight was the highest command level physically located in the missile field.

Missile Procedures Trainer. A mockup or simulator of an actual LCC which was located on the base. MPTs were configured internally to exactly resemble the interior layout of an actual LCC, with equipment mockups, chairs, and consoles located exactly in the positions of the actual LCC equipment. MPTs were used for crew training by DOTI (see below) and for crew evaluations by DOV (see below). The MPTs were operated by staff officers (AFSC 1835) who worked in DOTM (see below) and were referred to as MPTOs (Missile Procedures Trainer Operators).

Not Launch Capable (NLC). This term was used to describe an LCC which was not capable of launching or contributing to the launch of a missile or missiles - generally because of an equipment fault.

Not Mission Capable. This term was used to describe an LF which was not capable of performing its mission; i.e., the missile could not be launched - generally because of an equipment fault.

Squadron Command Post (SCP). An LCC which contained specialized communications and computer equipment not found at ordinary LCCs. One LCC in each squadron of 5 LCCs was an SCP. The SCP MCCC was the day-to-day commander of the squadron's LCCs. During wartime, the



MCCC at the SCP would become the functional squadron commander. The Alternate Command Post (ACP) was an SCP which contained even more specialized communications not found at other SCPs (the ACP also functioned as the SCP for its squadron). Each missile wing had one ACP-configured LCC. In wartime, the ACP would become the Wing Command Post for its wing, and the MCCC on duty (usually a Captain or a First Lieutenant) would become the functional wing commander.

#### Equipment Definitions

AFSATCOM. An acronym for the Air Force Satellite Communications System (often called "C<sup>3</sup>" or "cee-cubed" by MCCMs). In 1983-1984, LCCs were given a communications equipment upgrade which connected the LCCs to the AFSATCOM communications net. This was a worldwide net which used satellites to link all users together. The ability to send and receive messages to and from any other user in the net would provide LCCs a vast advantage during wartime.

HF Radio. A shortwave radio transceiver with worldwide range installed in the LCCs. Used for a backup means of communication.

MF Radio. A Medium-Frequency radio rack installed in LCCs at the 321 SMW (Grand Forks AFB) and at the 564 SMS (Malstrom AFB) only. Used only for missile/LF computer - LCC computer communications, this equipment was used as a backup for the cable connections between LFs and LCCs. It could not be used for human-to-human communication.

PAS. An acronym for the Primary Alerting System, a telephone-carried, one-way (two-way at ACPs) voice communications system which carries messages from SAC and numbered air force headquarters to each LCC, and was also used by the Wing Command Post. There were two PAS

speakers (one for SAC and one for numbered air force) mounted on each crew member's console in the LCC.

SACCS. An acronym for the SAC Automated Command and Control System, a landline (telephone-carried) one-way communications system (two-way at SCPs). This system ran directly from SAC Headquarters to each LCC, via each base's Command Post. The SACCS provided a hard-copy printout, usually a repeat of messages received via PAS.

SLFCS. An acronym for Survivable Low-Frequency Communications System. A low-frequency radio receiver which printed out radio messages on a roll of paper.

UHF Radio. A UHF transceiver installed in each LCC.

#### Organizational Definitions

An understanding of the organizational structure of the Minuteman Strategic Missile Wing is essential to anyone wishing to know the background of this research. The following definitions and figures are designed to explain the wing organizational structure. The wing (the SMW) is the prime organization on a Minuteman base. On bases such as Ellsworth AFB, Grand Forks AFB, and Minot AFB which had B-52 bomber wings (BMW) assigned, the missile wing was always the "host unit", with the missile wing commander technically being the highest ranking officer on the base, even if the bomb wing commander actually had a higher rank. The two major divisions of the missile wing (there were also supporting units) were the maintenance deputate and the operations deputate. These are discussed below. The head of the maintenance deputate was the Deputy Commander for Maintenance, the DCM. The head of the operations deputate was the Deputy Commander for Operations, the DO.

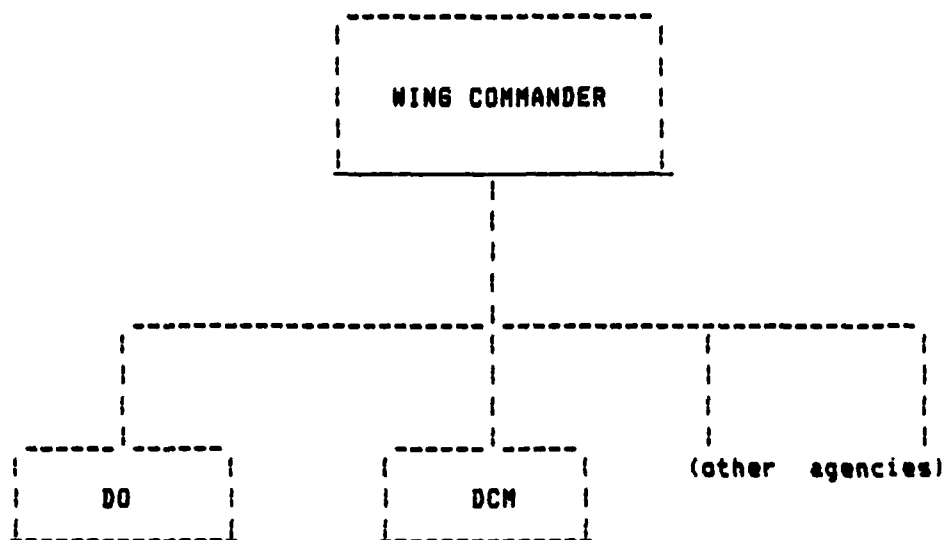


Figure 4. Strategic Missile Wing

Strategic Missile Wing (SMW). (see Figure 4) Consisted of the three or four strategic missile squadrons (four each at the 90SMW at FE Warren AFB and at the 341SMW at Malmstrom AFB, three at the other wings), the two maintenance squadrons assigned (Field Missile Maintenance Squadron and Organizational Missile Maintenance Squadron), a Security Police Group (SPG) which was responsible for all Security Police personnel assigned to the base and for two or more Security Police squadrons assigned to the missile field, a Combat Support Group (CSG) which contained the Civil Engineering Squadron (CES), the base hospital squadron, the supply squadron, the personnel office, a communications squadron (actually not a SAC unit at all), a weather detachment, various smaller functions, and the staff and administrative agencies attached to all of these. The Wing Commander, assisted by the Vice Wing Commander, was ultimately responsible for all of these agencies.

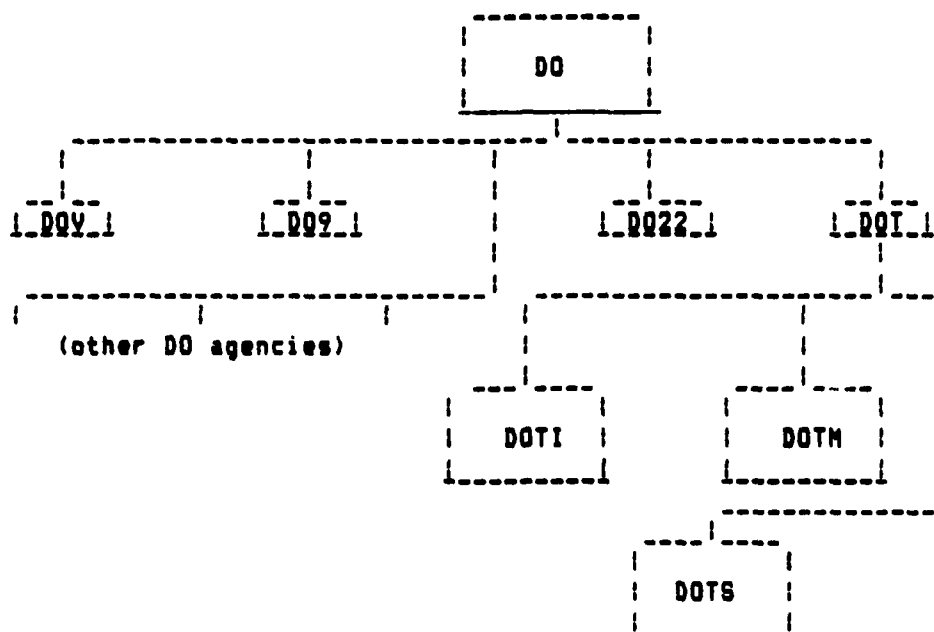


Figure 5. Deputy Commander for Operations Agencies

DO. (see Figure 5) An acronym for the Deputy Commander for Operations. All agencies prefixed with this acronym, such as DDV, DD9, etc., fell under the jurisdiction of the DO, as did the SMS squadrons. The DO was generally a Colonel (O-6), but was sometimes a Lieutenant Colonel selected for promotion to Colonel. The DO was subordinate to the Wing Commander and was responsible to the Wing Commander for the wing's operations functions. DO agencies, including the SMS squadrons, were generally commanded by Lieutenant Colonels (O-5, AFSC 1816). The SMS squadron and its organizational structure are discussed elsewhere in this chapter.

DOT. An acronym for the Training Directorate which was a DO staff agency. DOTI, the agency in charge of recurring MCCM training, was a subdivision of DOT; as were DOTM, the agency in charge of LCC training simulators, and DOTs, the agency in charge of scheduling MCCM alerts.

DOTI. The Instructional Branch of DOT. As mentioned above, DOTI was a subdivision of DOT, and was charged with recurring MCCM training. DOTI conducted monthly training days for all MCCMs. This training covered weapon system peculiarities, generally concentrating on a few items of equipment and/or checklist procedures per month. MCCMs were given written tests on this material. DOTI personnel were MCCMs, and "pulled alerts" at the LCCs just as MCCs assigned to the SMS squadrons did. DOTI MCCMs also trained other MCCMs in the MPT on a recurring basis, and trained items when requested to do so by DOV or DO22.

DOV. Acronym for the Evaluation Directorate which was a DO staff agency. DOV periodically evaluated MCCs to insure that standardization was achieved and that a minimum level of competence was achieved by all MCCMs. MCCs were evaluated (as a crew) both at the LCC while on an actual alert and in the Missile Procedures Trainer (MPT). MCCs/MCCMs were scored on performance during an evaluation. Crews who failed an evaluation could be subjected to sanctions by both their squadron commanders and by the DO. DOV personnel were MCCMs, and "pulled alerts" at the LCCs just as MCCs assigned to DOTI and the SMS squadrons did. As with DOTI, only the "best" MCCMs were supposed to be assigned to DOV.

DO9. The acronym for the Codes Division. This agency was in charge of the maintenance and proper use of the various classified electro-mechanical coding devices used to encrypt cable and radio transmissions between LCCs and LFs. These transmissions were encrypted in order to guard against any unauthorized attempts to monitor or to

interfere with the transmissions for purposes of espionage or sabotage. Although the Codes Division was a DO agency, the nature of the Codes Division mission meant that Codes Division personnel worked closely with the maintenance squadrons and agencies as well as with the SMS squadrons and other DO agencies. Codes Division personnel were additionally tasked with administering monthly training in classified code handling procedures to both maintenance personnel and MCCMs. The Codes Division was staffed by officers (AFSC 1835) and by NCOs. The officers had been MCCMs. The NCOs generally had worked in the DCM deputate. The Codes Division was physically located inside a vault, which was actually closed and secured after duty hours by a large bank vault-type door.

DO22. Acronym for the Plans and Intelligence Division, a DO agency. This agency had several components, all of which performed classified duties related to the wing's EWO responsibilities. DO22 was the local authority for EWO matters and as such was often consulted by DOV personnel during MCC evaluations and by SMS MCCMs with questions on EWO matters. DO22 EWO instructor personnel conducted monthly training sessions for all MCCMs and DO staff officers. Other DO22 officers performed functions connected with the protection and periodic updating of the many classified EWO-related documents maintained by the wing. The Wing Intelligence Officer, often a Lieutenant, also was assigned to DO22. With the exception of the Intelligence Officer, who held an Intelligence AFSC, DOV staff officers held AFSC 1835, and had been MCCMs, usually in DOTI or DOV. Like the Codes Division, the Plans and Intelligence Division was physically located inside a vault, and was secured with a bank vault-type door.

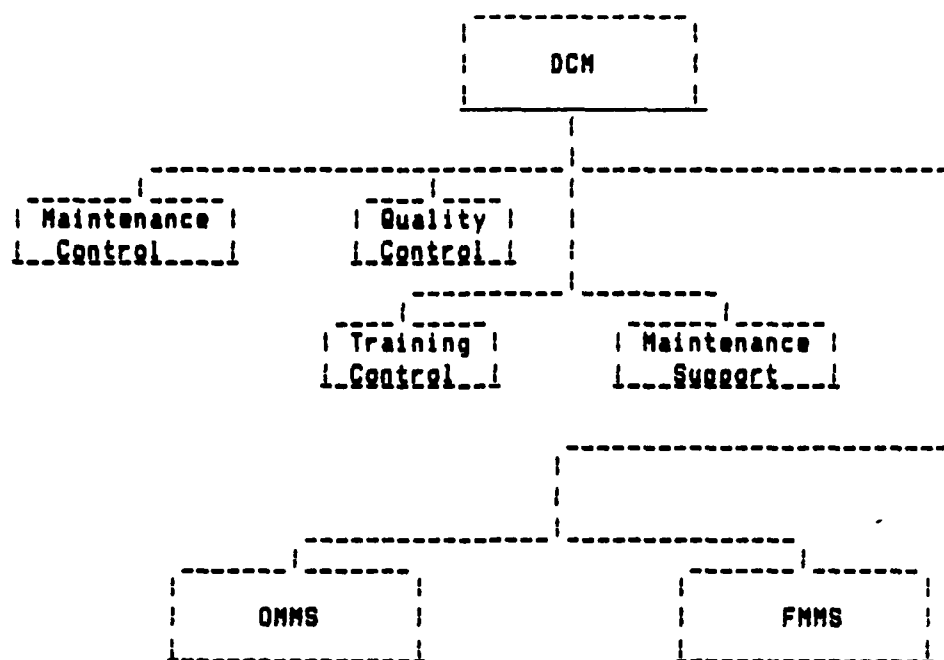


Figure 6. Deputy Commander for Maintenance Agencies

**DCM.** (see Figure 6) An acronym for the Deputy Commander for Maintenance. The DCM was generally a Colonel (O-6) but was sometimes a Lieutenant Colonel selected for promotion to Colonel. The DCM was subordinate to the Wing Commander, and was responsible to the Wing Commander for maintenance performed by the missile maintenance squadrons and DCM agencies.

**FMMS.** An acronym for the Field Missile Maintenance Squadron. One of the two missile maintenance squadrons assigned to all Minuteman wings. Among other branches, FMMS included the Electronics Laboratory (E-Lab) which performed in-shop maintenance on most LCC electronic drawers (AFSC 316X28). Also in the FMMS squadron was the Facility Maintenance Branch, which provided Facility Maintenance Teams (FMT),

that performed most heavy equipment maintenance in the LCC. The Facility Maintenance Branch also supplied Periodic Maintenance Teams (PMT - AFSC 445X0). PMTs visited each LCC every 180 days to perform routine maintenance (priority 5 or higher). This included battery inspection, corrosion inspection, tightening nuts and bolts, and repairing some outstanding routine discrepancies such as missing screws, etc.

OMMS. An acronym for the Organizational Missile Maintenance Squadron. One of the two missile maintenance squadrons assigned to all Minuteman wings. This squadron "...provides missile maintenance support through the use of maintenance teams (7:Vol. VI, paragraph 3-8)." The greater part of the OMMS mission concerned LF and missile maintenance, not LCC maintenance. Among other branches, OMMS included Electro-Mechanical Teams (EMT - AFSC 316X0). EMTs were responsible for most "R&R" drawer maintenance in the LCCs, except for certain communications equipment drawers which were removed, replaced, and repaired by the Communications Squadron.

Communications Squadrons. One communications squadron was assigned to each strategic missile wing. These squadrons were not a part of SAC but were under the jurisdiction of the Air Force Communications Command (AFCC). As pertained to the LCCs, technicians from this squadron performed both remove-and-replace and in-place maintenance on HF radios, the SACCS, the SLFCS, AFSATCOM racks, and UHF radios. They did not remove and replace the MF radios, which were maintained by EMT teams from the FMMS squadron because these radios were not used for human-to-human communications.



Maintenance Control Division. A DCM agency. This agency included Scheduling Control, Job Control, and Materiel Control. Scheduling Control schedules maintenance. This was a complicated and intricate task involving the juggling of manpower, supply, geographical, priority, and other factors. The function of Job Control was to track the different maintenance teams and equipment while the teams were out in the missile field. Job Control also tracked the progress of the maintenance tasks. Another function of Job Control was the "writing up" and prioritization of faults and discrepancies discovered by maintenance teams or by MCCMs. Job Control often had to talk a maintenance team through an unfamiliar or seldom-performed maintenance task over the telephone. This practice could be important to MCCMs performing LCC maintenance. Materiel Control ("Mat Control") functioned as the maintenance liason with the supply squadron and as a supply point for the maintenance squadrons. Mat Control received parts ordered from supply and distributed these parts to the shops and to the teams going out into the missile field. If MCCMs were to transport drawers out to LCCs, they could pick up the drawers at Materiel Control before departing the base.

Quality Control Division. A DCM agency which performed a function similar to that of DOV. Quality Control and Evaluation ("QC&E") involved the evaluation of maintenance teams on the performance of assigned tasks and the inspection of completed work (looking for loose screws, improperly installed cables, malfunctioning equipment, etc.). QC&E personnel were experienced maintenance technicians who were brought into Quality Control.

Training Control Division. A DCM agency which was in charge of all maintenance training (except codes training, handled by DO9). An important subdivision of this agency was the Team Training Branch (TTB). TTB's function was to train maintenance teams. New arrivals were taught to work as a team on maintenance tasks assigned to their AFSC. TTB also handled upgrade training and recurring training of maintenance personnel.

SACNET. An acronym for the SAC Management Engineering Team. A SACNET team was assigned to each SAC base. SACNET insured that an organization's manning reflected the organization's workload. SACNET could recommend to SAC Headquarters that manpower slots be taken away from an organization.

Fault or Discrepancy Reporting. Personnel who discovered a fault reported it to Job Control, usually by telephone or over the VHF radio net. A typical scenario might have involved a MCC which discovered that a piece of their equipment was malfunctioning. If it was communications equipment, for example the HF radio, the fault was telephoned in to the job control desk at the Communications Squadron ("Comm Job Control"). Faults detected in Civil Engineering-maintained equipment were reported to the Civil Engineering squadron. Otherwise, the fault was normally telephoned in to Job Control (some low-priority faults were reported to other DCM agencies). Job Control asked the MCCM to tell them exactly what was wrong. Based on this information, the technicians at Job Control consulted technical data, decided what the fault was, and assigned a Job Control Number (this process was called "writing up" the fault).

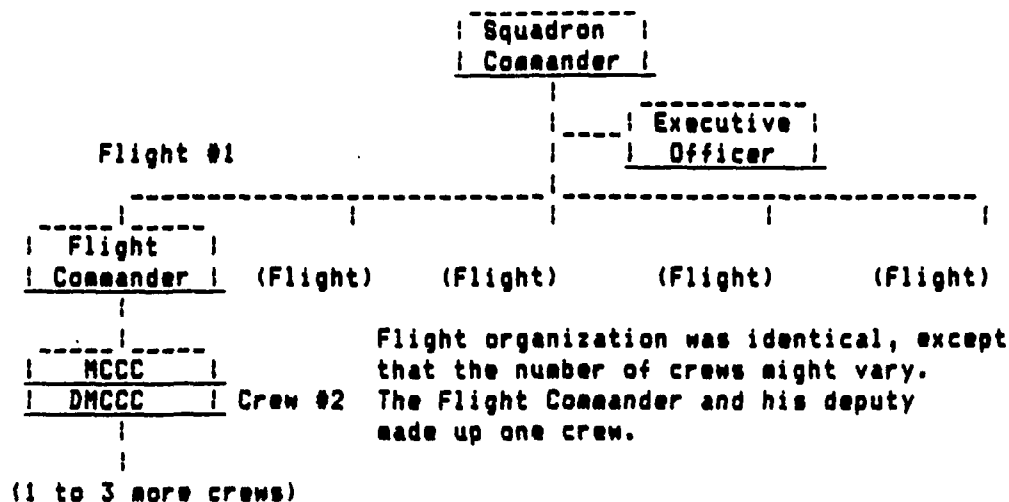


Figure 7. Strategic Missile Squadron

Strategic Missile Squadron (SMS). (see Figure 7) Consisted of five Flights. The Squadron headquarters and its administrative function were located on the base, as was the Strategic Missile Wing (SMW). Generally commanded by a Lieutenant Colonel (O-5, AFSC 1816). Approximately 2/3 to 3/4 of the MCCMs were assigned to SMS squadrons, the remainder being assigned to DOTI and DOV.

#### Background

The Strategic Air Command (SAC) was responsible for the operation and maintenance of all U.S. land-based intercontinental ballistic missiles (ICBMs). This included the Minuteman missiles which were based at six Minuteman Missile Wings located in the western part of the continental U.S. The Minuteman missiles were located in unmanned Launch Facilities (LFs) which essentially consisted of a reinforced concrete tube containing the missile and its support equipment located in and adjacent to the tube (see Figure 2). Each LF contained one missile. Maintenance of the missiles and their support equipment in the field was

performed by the wing's maintenance squadrons. Maintenance was accomplished by priority and some jobs had to wait to be done. Normally, maintenance of the missiles themselves and of their co-located electronic and mechanical support equipment was performed before other types of faults were worked (7:Vol. III, Para. 1-6a).

The Launch Control Center (LCC) was a permanently manned, hardened underground facility capable of monitoring and controlling up to 50 Minuteman missiles (see Figure 2). Each operational LCC was always manned by Missile Combat Crew Members (MCCM). They were assigned to two-man Missile Combat Crews (MCCs). Each crew consisted of a Commander and a Deputy who were on duty for a 24-hour period. Unlike the Titan II ICBM weapon system in which the missile was co-located with the LCC, no Minuteman missiles were located at or near LCCs. Each LCC was located miles away from other LCCs and from the unmanned LFs. Both the LCCs and the LFs were located from 25 to 150 miles away from the base in an area usually referred to as the "missile field" (see Figure 3). The missile field could be in excess of 100 miles on a side. The shape and dimensions of the missile fields varied somewhat between wings.

One LCC normally monitored and controlled 10 missiles. An LCC and its 10 missiles made up a Flight. Five LCCs and their 50 missiles made up an operational squadron. If an LCC was not operational then other LCCs in the squadron could exercise command and control over the missiles normally assigned to the non-operational LCC, because each LCC's computer was always in touch with the computers at all LFs and with the computers at other LCCs. A problem at an LCC or LF would instantly be detected by all LCCs.

As previously mentioned, maintenance in the missile field was prioritized. In the hierarchy of repair priorities, the speed with which one piece of equipment was repaired was a function of the equipment's relative rank among all pieces of faulty equipment awaiting repair (7:Vol. III, Table 1-1 and paragraph 1-6). This assumed the instant availability of any parts that may have been needed to repair or replace the faulty equipment. Naturally, a piece of faulty equipment with repair parts on hand would be repaired ahead of another piece of faulty equipment which may have had a higher repair priority but for which parts were back-ordered. The hierarchy of priorities was enumerated in SACR 66-12, Volume III, Table 1-1 (see Figure 8). Each wing's Maintenance Control Division used Table 1-1 as a guide to assign priorities to equipment faults (7:Vol. III, paragraph 1-3). There were specific instances when high-priority LF maintenance took precedence over high-priority LCC maintenance:

[M] The subcategories of priority 2 listed in Table 1-1 were in order of their relative importance. As a general rule, when there were two Not Launch Capable (NLC) LCCs in the same squadron, Not Mission Capable (NMC) LFs anywhere in the unit should receive higher priority even though both situations were priority 2. On the other hand, when there were three NLC LCCs in the same squadron, the LCCs should receive higher relative priority (7:Vol. III, paragraph 1-6).

The rationale behind this quotation was that while the missiles belonging to a NLC LCC could be launched by other LCCs, the missile assigned to an NMC LF could not be launched at all.

Figure B. Table 1-1 of SACR 66-12, Vol. III. "UND" means "Urgency of Need Designator", a supply term. An "A" in the UND column reflects a more urgent need than a "B" would, a "B" reflects a more urgent need than a "C", and so on.

1-6

SACR 66-12, VOL III (C1) 21 September 1983

TABLE 1-1

MISSILE MAINTENANCE PRIORITY DESIGNATORS

MAINTENANCE PRIORITY	APPLICATION	SUGGESTED UND
1	Maintenance required to repair critical equipment required for safe operation of the weapon system.  Maintenance after an incident or malfunction to: prevent further damage to the weapon system, avoid injury to personnel, or render the weapon system safe.	A
2	Maintenance required to place on alert or return to alert: LFs or launch complexes (includes LCCs when three or fewer LCCs or operational in a squadron).  a. Maintenance required to retain or return ERCS off-alert or impaired sorties to alert or unimpaired status.  b. Maintenance required to retain or return "A CAT" sorties to EWO alert status.  c. Actual EWO generation of "F CAT", "L CAT", and AFSC/AFLC-owned LFs, LCCs, and launch complexes.  d. Maintenance required to deposture LFs, LCCs, and launch complexes committed to major modification efforts.  e. Maintenance required to posture LFs, LCCs, and launch complexes being returned from major modification programs (until sortie is declared "A CAT").	A

Figure B. Table 1-1 of SACR 66-12, Vol. III (Continued)

**MAINTENANCE  
PRIORITY**

**APPLICATION**

**SUGGESTED  
UND**

f. Maintenance required to restore the squadron Inertial Performance Data (IPD) collection capability through the Squadron Command Post (SCP) LCC to the Strategic Missile Support Base (SMSB).

A

g. Maintenance required to deposture or posture LFs, LCCs, and launch complexes for command-approved or directed test programs. Includes maintenance at Vandenberg AFB for test refurbishment after launch.

h. Maintenance required to repair severed, damaged, or seriously degraded Hardened Intersite Cable System (HICS).

- 3 Discrepancies expected to affect alert posture or significantly degrade impact accuracy.

Discrepancies which are time sensitive as directed by technical data or which, because of the nature of the discrepancy, require periodic monitoring.

All PMC conditions not specifically identified as priority 4.

Maintenance required to support Minuteman periodic maintenance dispatches even though the package may be composed of discrepancies of lower priority.

Precision Measurement Equipment (PME) requiring emergency repair or calibration, the lack of which will delay prevent mission accomplishment.

Maintenance required to return an LCC to operational status when at least four are operational in the same squadron.

Time-change requirements for re-entry systems and Titan airborne components when the due date is imminent (within 30 days).

Maintenance required to keep the Titan fixed fire water circulation system and permissive fire water control switch operational.

Security system discrepancies which require two two-man camper alert teams IAW SACR 207-16.

Figure 8. Table 1-1 of SACR 66-12, Vol. III (Continued)

**MAINTENANCE  
PRIORITY**

**APPLICATION**

**SUGGESTED  
UND**

Critical end items and reparable spares designated "PRIORITY REPAIR".

Maintenance required to return Titan FVSS Mine Safety Appliance (MSA) equipment to operational status.

- |   |  |   |
|---|--|---|
| 4 | Security system discrepancies which require one two-man camper alert team IAW SACR 207-16. | A |
|---|--|---|

Scheduled training dispatches/tasks.

Training devices requiring repair which prevent or delay student or maintenance training.

TCTOs and MCLs which if not promptly completed could exceed recision date.

Discrepancies expected to affect systems or subsystems which will not directly impact alert posture but may result in a guarded site or a PMC condition or a safety deficiency if not corrected in minimum time.

Maintenance required to bring serviceable quantities up to an established critical level.

- |   |  |   |
|---|--|---|
| 5 | Time change requirements for re-entry systems and Titan airborne components when due date is not imminent. | B |
|---|--|---|

Overdue periodic inspections and time change items.

Discrepancies not expected to result in a PMC condition; but, if corrected will enhance safety, weapon system operation or increase reliability.

- |   |   |   |
|---|---|---|
| 6 | Periodic inspections, TCTOs, MCLs, and time change items. | C |
|---|---|---|

Routine maintenance of training activities.

Scheduled calibration and unscheduled repairs of PME not listed under a higher priority in this table.

- |   |  |   |
|---|--|---|
| 7 | Routine repair of missiles and support equipment to include repair cycle assets. | C |
|---|--|---|

Figure 8. Table 1-1 of SACR 66-12, Vol. III (Continued)



**MAINTENANCE  
PRIORITY**

**APPLICATION**

**SUGGESTED  
UND**

Fabrication and repair of weapon system items not carrying a higher priority of non-weapon system items.

8 Reserved for future use.

NA

9 Deferred.

NA

NOTE: Shop maintenance required to repair items needed to clear site discrepancies will carry the priority of the site discrepancy if repair is not adequately covered elsewhere in this Table.

Figure 8. Table 1-1 of SACR 66-12, Vol. III (Continued)

The above table demonstrates the importance that SAC placed upon the proper performance of maintenance and upon proper lines of authority. This table would be rewritten or a new table added to the regulation if the concept of MCCMs performing LCC maintenance were to be implemented command-wide.

The suggestion has been made at SAC Headquarters, at Fifteenth Air Force Headquarters, and at some wings, that the MCCMs on duty at each LCC could perform some of the more simple maintenance. This simple maintenance would include such things as removal and replacement of drawers, replacing missing screws, tightening screws and equipment handles, replacing fuses and light bulbs, etc. The perceived advantages of this concept were (1) that at least some LCC faults would be repaired faster, and (2) that significant savings in fuel and manpower costs could be achieved. There was also the possibility that the concept might provide job enrichment for the MCCMs. Therefore, the area of MCCM job enrichment was examined to the extent it impacted upon the concept of MCCMs performing maintenance. However, the study of job enrichment was not the main thrust of this research.

### Research Objective

The objective of this research was to answer the research question by accomplishing the following subobjectives:

1. Conduct a detailed analysis of the existing maintenance/operational structure of the wings.
2. Conduct a detailed analysis of the existing data, including maintenance records and the written material generated by the Project Teamwork effort.
3. Conduct a thorough review of the literature, including SAC Regulation 66-12 and literature pertaining to past job enrichment proposals for Minuteman MCCMs.
4. Conduct an attitude survey and analyzed the responses using statistical tools.
5. Generate new data on MCCM alert duties using survey responses.

### Literature Review

The literature could be broken down into three broad categories as follows: (1) Data on past missile maintenance, from all six missile wings, which was available at the SAC Maintenance Analysis Division at Strategic Air Command Headquarters. (2) Correspondence, replies to correspondence, formal opinions, and critiques transmitted between SAC Headquarters and the 321st Strategic Missile Wing (SMW) at Grand Forks, North Dakota from 1982 to 1984. This material concerned Project Teamwork, the study project of MCCMs performing LCC maintenance which the 321st SMW was proposing to conduct beginning in June of 1984. The material included the 321st SMW Plan of Operations (OPORD) for the performance of the study, and a critique of the OPORD by the SAC Office of Missile Maintenance Policies and Procedures (SAC/LBBA). (3) Past literature on job enrichment proposals for Minuteman MCCMs and Minuteman maintenance personnel. This literature consisted mostly of Air Command

and Staff College (ACSC) research papers. So many ACSC papers have been written about Minuteman operations and maintenance personnel that only the latest, most relevant papers were included in this review.

SAC Regulation 66-12, Intercontinental Ballistic Missile Maintenance Management, Volumes I to VI, covered all aspects of the ICBM maintenance organization functioning. Any proposals which would change maintenance structure or responsibilities must meet the criteria set forth by this regulation (6:Vol.I, Para. 1-6). Interestingly, there was a section in Volume I (Paragraph 1-6) entitled "Testing Procedural Improvements" which stated that "Improvement of maintenance management is essential to keep pace with technology and to maintain an economical operation" (6:Vol. I, Para. 1-6). The paragraph set forth the rules for conducting field tests of new procedures. The field test at the 321st Strategic Missile Wing (SMW) was to be conducted in accordance with this section of the regulation.

In order for the concept of operations personnel performing maintenance to be implemented, portions of 66-12 would have to be revised to account for the inclusion of these personnel into the maintenance environment and to set forth the new division of tasks. The subject of limitations on types of maintenance which operations personnel could perform would also have to be addressed by the regulation and by local Operating Instructions at each Missile Wing. Maintenance performed by operations crews would differ slightly from one wing to another because of physical differences in the layout of the LCCs and different types of installed equipment.

The pre-existing data which was analyzed as a part of this research

effort was in the form of maintenance records gathered from all six Minuteman wings over the years and kept at SAC Headquarters by the SAC Maintenance Analysis Division (LGY). These records documented the number of times each kind of maintenance task was performed. The data was analyzed to determine what percentage of the total maintenance performed was of the type which would be performed by MCCMs if the proposal were adopted. The data base could be grouped by time period, wing, type of maintenance, or in any other way which could aid in an analysis.

An examination of the correspondence between SAC/LGBA and the 321 SMW concerning Project Teamwork gave the ongoing history of the planning of the only field test ever proposed on the concept of MCCMs performing maintenance. The Plan of Operations (OPORD) written by Capt. Roger Forsyth of 321SMW/DOV, and other 321 SMW operations personnel, described in detail their ideas on how to train MCCMs in maintenance and precisely which maintenance tasks would be performed by MCCMs. The SAC Office of Maintenance Policies and Procedures critique of the OPORD gave the thoughts and philosophy of SAC maintenance managers on the same subjects, in detail.

In light of the above, it is interesting that T.O. 21M-LGM25C-1, which is the operations technical order for the Titan II weapon system, lists one of the duties of the Titan II crew commander as: " f. Directs malfunction analysis activities to return weapon system to a state of readiness as quickly as possible [B:7-3]." Titan II crews have maintenance technical orders available which they use to isolate malfunctions. The actual malfunction as defined by this maintenance technical data makes up the information called in to Job Control, unlike

the Minuteman weapon systems where the symptoms only are called in. In Minuteman, Job Control makes the final determination as to what actually is wrong. In fairness to Minuteman crews, it should be noted that Titan II crews have four members, two of whom are enlisted technicians who know maintenance procedures.

Allgaier (1:74) commented on the operations-maintenance division in the U.S. missile force structure as follows:

A main conclusion that the author has reached is that it is important to break down parochialism, artificial distinctions, and barriers when possible, to enable "blue suiters" to function as a team. This is particularly true when constraints, such as money and the nature of the task, don't really enter the picture and policy is the inhibiting force.

Allgaier, Christie (3), Kuenning and Mattson (5), and Paolucci (6) were all concerned to some degree with job enrichment. Christie analyzed MCCM job satisfaction by administering the Minnesota Vocational Psychology Research Test to the entire force of MCCMs at Grand Forks AFB in 1977. He found the MCCMs' needs for achievement, ability utilization, creativity, and responsibility were not adequately met by their alert duties (3:25-28). He believed that giving MCCMs added responsibilities, such as in the area of maintenance, would help to meet these needs (3:29-32).

Kuenning and Mattson (1976) stated that the level of job dissatisfaction among MCCMs was three times the average nationwide level for all types of American workers (5:125). They essentially proposed that MCCMs should voluntarily assume some of the duties of missile maintenance officers (5:128). The actual proposal was complicated and involved the organization of another layer of bureaucracy within the missile wings. In any event, their proposal was not adopted by SAC.

Paolucci (1977) concluded that MCCMs were dissatisfied with their jobs because they lacked the power to actually command their Missile Flights (6:36). He cited examples of MCCMs who gave lawful orders to Security and Food Service personnel assigned to their flights, only to have the orders countermanded by the enlisted supervisors of these personnel who were located back on the base (6:15-18). Paolucci also felt that the prestige and authority of operations squadron commanders was diminished and preempted by the various staff agencies of the DO (Deputy Commander for Operations), who is the squadron commanders' boss:

The squadron commander functions more as an administrator than as a commander due to this centralization of operations in the [DO's staff agencies]. The squadron commander becomes divorced from the operations functions since he has a limited span of control, does "own" but does not manage the launch control facilities, and has little authority in functions which impact on his crew members (6:18-19).

Paolucci proposed that crew job dissatisfaction be diminished and squadron commander authority increased by assigning security and food service personnel to the operations squadrons and by giving the MCCMs command authority over those personnel. He gave specific and detailed descriptions of how the proposal could be implemented (6:29-33). Although Paolucci commented upon various proposals of previous researchers (6:21-26), including job enrichment proposals (6:23-24), he did not address the subject of Minuteman maintenance.

Chenzoff's report (2) was part of a series of research reports ordered by the Air Force and was conducted in collaboration with the Human Resources Laboratory at Wright-Patterson AFB. The study was an

exploratory study using a qualitative methodology which the authors defended as "necessary in an exploratory study of this kind because the emphasis is on the discovery of ideas and insights..." (2:1-4). The researchers interviewed maintenance personnel of all ranks at one Titan II and three Minuteman wings. The researchers were looking for data in 271 "factors," or categories. They actually made recommendations for improvement in 115 of these categories, ranging from frequency of PCS (Permanent Change of Station) moves/transfers of personnel to availability of adequate transportation to and from the missile field. The objective of the study was to "obtain a deeper understanding of the factors which influence (missile) maintenance, from the perspective of the persons most actively involved" (2:1-1). The study offers a rare look into the maintenance person's view of maintenance. The value of this study to the research effort lies in its plethora of information and opinions derived from the structured interviews. Where the researchers saw trends in the responses, these were commented upon.

One trend perceived by Chenzoff, et al. was a sort of a "union-shop" attitude prevalent among different AFSCs and maintenance shops (2:11-1 and 11-2). Individuals often had little idea of the mission and workload of other shops. Another area of concern to maintenance personnel working out in the missile fields was time spent driving from one job site to another (2:5-1). Similarly, these same personnel felt that they were always under excessive pressure (2:5-2-3), and worked too hard for too long hours (2:5-3-3). In 1984, a 16-hour workday was permitted. In a similar vein, managers in charge of manpower allocation worried about not having enough people available to do

essential maintenance (2:5-4-1). These types of concerns reflected a perceived need for either more personnel or less maintenance. If the concept of operations personnel doing some maintenance in the LCCs were to prove feasible, a part of this workload could be transferred from the maintenance organizations.



## II. Methodology

### Specific Problem

The objective of this research was to assess the practicality of MCCMs performing minor LCC maintenance. The research results were to be made available to decision-makers who could then decide whether to implement the proposal.

Investigative Questions. The Investigative Questions used are listed here.

- (1) Would the use of operations personnel as maintenance extenders enable Minuteman Missile Wings to use their maintenance resources more effectively, as measured by: (a) A lower projected quantity of LCC electronic equipment downtime; (b) Less manhours spent by maintenance personnel in the LCCs; (c) A projected lower use of fuel by maintenance vehicles?
- (2) What would be the principal problems involved with the implementation of this proposal and how could they be overcome?
- (3) To what extent might the above problems be "people" problems and what could be done about them?
- (4) What would be the benefits of implementing this proposal?
- (5) To what extent can the benefits be quantified?
- (6) Do the identified benefits outweigh the identified disadvantages, or vice-versa? (The primary decision rules would be fuel and maintenance manhours saved, if any; and any measurable decrease, real or projected, in LCC equipment downtime. A secondary decision rule, harder to measure except by a longitudinal study, would be an increase in job satisfaction by MCCMs.)

The above questions were answered by: (1) An analysis of SAC Regulation 66-12, Intercontinental Ballistic Missile Maintenance Management, to insure that the proposal remained within established guidelines; an analysis of the existing literature

concerning job enrichment of MCCMs; an analysis of the material generated by the Project Teamwork study; and maintenance management data obtained from the maintenance analysis sections at the wings. (2) The results of an opinion survey administered to a stratified sample of 800 MCCMs, and to the entire population of operations staff and senior staff officers (about 240 individuals), Minuteman maintenance officers (about 210 individuals) and to all 7-level and 9-level supervisors in 316XX and 454XX AFSCs (see definitions in Chapter 1). The responses to the questionnaires were analyzed both qualitatively and quantitatively. The last survey question was a deliberate open-ended solicitation of responses. It was expected that a qualitative analysis of responses to that question would uncover opinions and trends not detected by the other survey questions. Certain other survey questions were included for the specific purpose of gathering data about how MCCMs spend time on alert. The responses were used to investigate and analyze the attitudes and opinions about this subject in an attempt to identify potential barriers to the successful implementation of the proposal. A secondary purpose of the survey was to gather data from the MCCMs as to how they spent their alert time. To the writer's knowledge, such data was never collected before. This data could be useful for future research as well as for this research.

### Hypotheses

The hypotheses were used as tests to determine whether or not measurable differences existed among the different survey populations regarding their feelings and opinions concerning MCCMs performing LCC maintenance. The following hypotheses were used:

Hypothesis 1. A majority (between 51% and 67%) of MCCMs would reject the proposal.

(a) The percentage rejecting would be smaller among First Lieutenants and Captains with 3 or more years on crew than among Second Lieutenants and First Lieutenants with less than 3 years experience, but a majority (more than 50%) of these more experienced MCCMs would still disapprove the proposal.

(b) More DMCCCs than MCCCs would disapprove of the proposal. This is a type of corollary of (a), since DMCCCs are almost always less experienced than MCCCs.

(c) Among MCCMs opposed to the proposal, the most common reasons given for opposition, not necessarily in order of importance, would be:

(i) Operations and maintenance should not be mixed, for various reasons, including:

- belief that it is beneath an officer's station to perform maintenance

- belief that operations and maintenance must always be separated as a principle

- an actual fear of the physical action of doing maintenance

- belief that MCCMs should perform no more maintenance than do other operations personnel - especially aircraft flight crews

(ii) A fear that crews would be evaluated on maintenance tasks

during scheduled Standardization Evaluations (see definitions under "DOV"), or that DOV Evaluator MCCMs would check other MCCM's work in the LCC.

(iii) A fear that an increase in training would result and this would mean a decrease in time off which is already perceived by MCCMs as being at a minimum.

(iv) A fear that an increasing number of maintenance tasks would be loaded onto MCCMs with the result being the MCCMs would come to be regarded as maintenance personnel.

(v) A belief that the existing workload in the LCC is too heavy to allow for maintenance by MCCMs. Of MCCMs expressing this belief, a majority would cite the presence of the new AFSATCOM equipment in the LCCs as contributing to an increased MCCM workload.

(vi) A fear that being trained in maintenance would degrade MCCM proficiency in their primary duties.

(vii) A fear that more time would be spent on an alert tour because of maintenance actions.

(viii) A belief that there would not be enough maintenance to justify the work of setting up the program.

(ix) A belief that implementation would cause friction between operations and maintenance functions.

(x) A belief that implementation would seriously damage MCCM morale.

(xi) A significant number (approximately 10%) of MCCMs opposed to the concept would request that a third crewmember be added to

help with a recently increased communications workload (due to the recent installation of AFSATCOM equipment).

(xii) A measurable number (approximately 5%) of MCCMs opposed would state that the old 40-hour alert concept used prior to 1978 should be reinstated so that one crew would be in the capsule for only 12 hours instead of for 24 hours (Under the "40-hour" alert system, two crews (MCCs) were on alert at one time - one crew actually in the LCC and the other in rest status topside in the LCF. Every 12 hours, the crews would change over. The alerts were about 40 hours long.).

(xiii) A belief that the SAC Management Evaluation Team (SACMET) would cut maintenance manning if the proposal were implemented.

(d) MCCMs working as DOV Evaluators or as DOTI Instructors would not differ significantly in percentages for and against the proposal from all other MCCMs (not more than 5% difference).

(e) MCCMs who approved of the proposal would do so with the following caveats:

(i) A belief that the Initial Qualification Training (IQT) given to officers who were in training to become MCCMs at Vandenberg AFB should be extended to include drawer removal and replacement familiarization training. This would move the burden of MCCM maintenance training from the wings to the 4315th Combat Crew Training Squadron at Vandenberg AFB.

(ii) A belief that LCC maintenance by MCCMs should be limited to simple removal and replacement of electronic equipment drawers, tightening handles and screws, and so on.

(iii) A belief that any LCC maintenance by MCCMs should only be performed with the approval and active cooperation of Job Control.

(iv) A belief that implementation of the proposal would save maintenance resources; principally fuel and maintenance manhours.

(v) A belief that MCCMs would not be capable of performing troubleshooting since they had not been trained in any maintenance troubleshooting techniques.

(vi) A belief that various "people" problems associated with implementation would inhibit the practicality of the proposal.

(vii) A belief that exposure to maintenance would broaden the horizons of MCCM officers.

(viii) A belief that exposure to maintenance would result in job enrichment for MCCMs.

(ix) A measurable percentage (approximately 5%) of MCCMs who approved of the proposal would also ask for a third crewmember to be assigned to help with a recently increased communications workload due to the recent installation of AFSATCOM equipment in the LCCs.

(x) A significant proportion (approximately 10%) of MCCMs who approve of the proposal would suggest that the "40-hour" alert system used prior to 1978 be reinstated so that one crew would be in the capsule for only 12 hours instead of for 24 hours.

(f) Approximately 75% of all MCCM respondents would answer either "d" or "e" to questions #44 and 45. These questions dealt with MCCM authority to control the flow of maintenance in their LCCs while on alert. Less than 50% of all MCCM respondents would choose answers "d"

or "e" to question #46, which dealt with inspection of completed maintenance by maintenance personnel.

Hypothesis 2. The proportion of MCCMs with maintenance experience who are opposed to the proposal will be significantly less (by approximately 20%) than the proportion of all other missile operations officers who are opposed to the proposal. The assumption was that MCCMs with maintenance experience would tend to be less anxious about performing maintenance because of their previous exposure to maintenance.

Hypothesis 3. The majority of all operations staff officers and operations senior staff officers (approximately 55%) would approve of the proposal.

(a) More operations senior staff officers (AFSC 1816) than operations staff officers (AFSC 1835) would approve of the proposal (approximately 10%). The assumption was that the operations senior staff officers's greater breadth of missile experience, often in both operations and maintenance, would tend to cause operations senior staff officers to favor the proposal.

(b) At least 20% more operations senior staff officers with maintenance experience would favor the idea than would operations senior staff officers who lacked maintenance experience. The assumption was that maintenance experience would be associated with a greater tendency to favor the proposal.

(c) Due to their relatively recent experience as MCCMs, the operations staff officers would parallel (within 5%) MCCM feelings on the proposal.

(d) More operations staff officers who were assigned to the Codes Division (D09) would favor the proposal than would operations staff officers who work in exclusively operations-oriented positions such as D022 and D0TM (approximately 15% difference). The assumption was that exposure to maintenance would be associated with an increased tendency to approve of the proposal.

(e) operations senior staff officers and operations staff officers would cite the same reasons as MCCMs for either favoring or opposing the proposal.

Hypothesis 4. The majority of Missile Maintenance Officer personnel would favor the proposal (approximately 55%).

(a) More Missile Maintenance Officer personnel with ICBM operations experience would favor the proposal than would Missile Maintenance Officers without operations experience (approximately 15% difference). The assumption was that wider breadth of experience would be associated with a tendency to favor the idea.

(b) More Missile Maintenance Officers in grades Second Lieutenant to Captain would disapprove of the proposal than Missile Maintenance Officers in grades Major to Colonel (approximately 10%). The assumption was that the more junior personnel would usually lack the breadth of experience of more senior Missile Maintenance Officers, as per the assumption of (a). The exception to this would be that junior Missile Maintenance Officers with ICBM operations experience would tend to favor, not disapprove of, the proposal (approximately 67% in favor), as per the assumption of (a).



(c) Missile Maintenance Officers favoring or disapproving of the proposal would generally cite the same reasons as MCCMs, operations senior staff officers, and operations Staff Officers. One exception to this would be that approximately 10% of the Missile Maintenance Officers disapproving of the idea would cite as a justification for disapproval a fear that MCCMs would not be capable of performing an acceptable level of quality maintenance, whether for reasons of a lack of training or a lack of talent.

Hypothesis 5. A majority of enlisted maintenance supervisors (approximately 55%) would favor the proposal.

(a) 3167X personnel (ENT and E-Lab technician supervisors) will approve of the idea (approximately 67%). The assumption would be that this would be due to a perceived lessening of the 3167X workload.

(b) A majority of 44570 personnel (FMT technician supervisors) would tend to be neutral concerning the proposal (approximately 55%). The assumption was that this was due to a perception by these personnel that drawer removal and replacement would be of only peripheral interest to the type of maintenance performed by the 454XX career field (Preventive Maintenance Inspections, battery maintenance, environmental control system maintenance, electrical power system maintenance).

(c) Significantly more 9-level AFSCs (99601, 31699, 45499) than 7-level AFSCs (3167X, 44570) would favor the proposal (difference of approximately 20%). These 9-level personnel were the senior enlisted supervisors, usually had a minimum of at least 10

years in Minuteman maintenance, and had an incomparable depth of understanding of the weapon system from a maintenance viewpoint. 44599s were former 44570 personnel, 31699s were former 3167X personnel, and 99601s could have been either or neither. The assumption was that the relatively greater breadth of experience, time in ICBM maintenance, and more time spent associating with operations personnel over the years would be associated with a greater tendency to favor the proposal.

Hypothesis 6. More respondents in every category who answered question #59 would choose answer "g" ("No inspection necessary if the equipment works properly.") than any other answer. This would be because of a general belief that MCCMs would perform the same level of quality maintenance on a drawer R&R as a regular maintenance team would. Further supporting evidence for this hypothesis would be over 50% of respondents choosing answers "a" or "b" for questions #18, 20, 30, and 34; and over 50% of respondents choosing answers "d" or "e" for questions #16 and 19. These questions all cover the area of MCCM ability to perform quality maintenance.

### III. Survey Responses and Maintenance Analysis Data

#### Survey Responses: Demographic Data

As was noted previously, the questionnaire (Appendix A) was sent out to MCCMs, operations staff officers (1835 AFSCs), operations senior staff officers (1816 AFSCs), missile maintenance officers (31XX AFSCs), 9-level enlisted supervisors in the 99601, 31699, and 44599 AFSCs, and 7-level enlisted supervisors in the 3167X and 44570 AFSCs. The address labels which were used to mail out the questionnaires to the field were generated by the ATLAS personnel computer via AFNPC at Randolph AFB, Texas. The computer was programmed to generate address labels in the following categories: (1) 150 MCCMs (1823 and 1825 duty AFSCs) at each of the six Minuteman wings for a total of 900 MCCMs. In statistical terms, this would be called a "stratified sample" of the MCCM population. (2) The entire population (in statistical terms, a "census") of operations staff and senior staff officers, missile maintenance officers, 9-level enlisted maintenance supervisors in AFSCs 31699, 44570, and 99601; and 7-level enlisted maintenance supervisors (3167X and 44570 AFSCs only) at each of the six Minuteman wings. The approximate size of each of these groups was estimated using commonly available personnel manning level data obtained from CBPO microfiche files and from manning estimates provided by Headquarters SAC/LGB.

The approximate size of each AFSC group was estimated to be as follows:

TABLE I  
ESTIMATED SIZES OF TARGET POPULATIONS

AFSC_Group	Estimated Size of Population
1816	90
1835	150
31XX	210
99601	75
31699	15
44599	5
3167X	175
44570	120

The ATLAS personnel computer search did not differentiate address labels by AFSC. This meant that the AFSC of any particular individual could only be guessed. This could be done with a fair degree of accuracy in most cases by comparing the rank and unit assignment of the individual. For example, a First Lieutenant assigned to a strategic missile squadron was in all likelihood a MCCM. A First Lieutenant assigned to a maintenance squadron would have to be a Missile Maintenance Officer. A Chief Master Sergeant was a 9-level supervisor. Returned questionnaires gave the respondent's duty AFSC and enlisted skill level (if applicable) as part of the demographic data section, questions 1 through 15. A total of 23 labels were discarded on first inspection because they were addressed to bases other than the six desired or because the individuals addressed did not fall in the target populations (examples: addressed to an A1C, who by virtue of lack of rank could not possibly be a 7-level or a 9-level). The remaining 1410 questionnaires were sent out to the field. 1047 questionnaires were returned for a percentage returned of 74.26%. Of those questionnaires returned, 37 were not usable for various reasons (ie, improperly filled

out so as to be unusable, enlisted respondents not 7-level or 9-level personnel). This left 1010 questionnaires available for analysis. The percentage of usable returns was therefore 71.63%.

Demographic Data. The breakdown of returned questionnaires by AFSC and by wing was as follows:

TABLE II  
RESPONDENTS AFSC BY WING MATRIX TABLE

	44SMW	90SMW	91SMW	321SMW	341SMW	351SMW	Total
MCCM	52	66	51	59	76	47	351
operations staff	16	21	19	14	20	14	104
operations senior staff	9	14	11	8	8	10	60
missile maintenance officer	33	26	27	30	29	26	171
9-level supervisor	13	18	15	14	17	13	90
3167X supervisor	29	27	22	24	24	22	148
44570 supervisor	15	11	12	17	18	13	86
Total	169	183	157	166	192	145	1010
							Grand Total

44 SMW - Ellsworth AFB, South Dakota  
 90 SMW - FE Warren AFB, Wyoming  
 91 SMW - Minot AFB, North Dakota  
 321 SMW - Grand Forks AFB, North Dakota  
 341 SMW - Malmstrom AFB, Montana  
 351 SMW - Whiteman AFB, Missouri

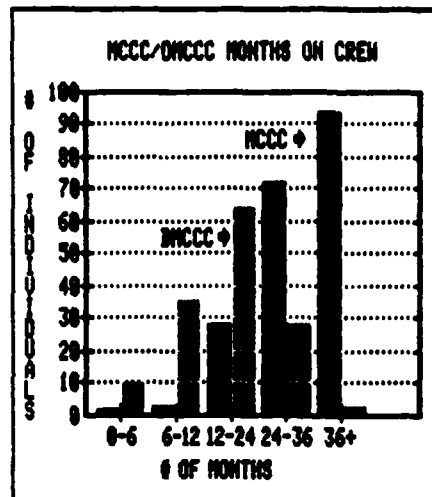


Figure 9. MCCCs and DMCCCs by Time on Crew in Months

Included among the respondents were the following numbers of Colonels and Lieutenant Colonels:

- 1 Deputy Commander for Operations (DO)
- 3 Assistant DOs
- 3 Deputy Commanders for Maintenance (DCMs)
- 3 Assistant DCMs
- 13 Strategic Missile Squadron Commanders (SMS/CCs)
- 9 Missile Maintenance Squadron Commanders (OMMS/CC or FMMS/CC)
- 18 Operations Division Chiefs (DO agencies)
- 14 Maintenance Division Chiefs (DCM agencies)

The breakdown of MCCMs by assignment was as follows:

- 42 Flight Commanders, 37 Flight Commanders' Deputies
- 103 Line MCCCs, 61 Line DMCCCs
- 16 DOV MCCCs, 15 DOV DMCCCs
- 33 DOTI MCCCs, 26 DOTI DMCCCs

Question #10 asked MCCMs how many months cumulative experience they had as MCCMs. The MCCCs who answered the question tended to have more experience than the DMCCCs because all MCCMs must begin their time as DMCCCs. Figure 9 demonstrates the resultant distribution among MCCCs and DMCCCs.

Assignments of operations staff (1835s) and senior staff (1816s)

were:

DOV (Evaluation): 3 senior staff, 0 staff  
DOT (Training): 9 senior staff, 26 staff  
DO9 (Codes): 6 senior staff, 33 staff  
DO22 (Plans & Intel.): 7 senior staff, 20 staff  
Other (including SMS squadrons): 33 senior staff, 24 staff

Question #15 asked operations personnel if they had any ICBM maintenance experience. Respondents were subdivided into four categories; senior staff, staff, MCCCs, and DMCCCs. Eight out of 60 (13.3%) senior staff officers, 12 out of 104 staff officers (11.5%), 13 out of 196 MCCCs (6.6%), and 3 out of 139 DMCCCs (2.2%) had previous ICBM maintenance experience. This data suggests that the likelihood of operations personnel having had maintenance experience increases with time spent in operations. Five senior staff officers, 7 staff officers, one MCCC, and one DMCCC had been missile maintenance officers. Two staff officers, 7 MCCCs, and 3 DMCCCs had enlisted ICBM maintenance experience. One staff officer and 3 MCCCs had been both enlisted maintenance personnel and missile maintenance officers. Three senior staff officers, 2 staff officers, and one MCCC had aircraft maintenance experience. One MCCC had missile maintenance experience on Trident submarines.

Officers in missile maintenance (31XX AFSCs) were assigned as follows:

20 assigned to maintenance squadrons (FMMS or OMMS)  
24 assigned to Maintenance Control Division  
12 assigned to Maintenance Support Division  
5 assigned to Quality Control Division  
9 assigned to Training Control Division  
7 worked directly for the DCM (included 3 DCMs, 3 Assistant DCMs)  
4 assigned to other functions

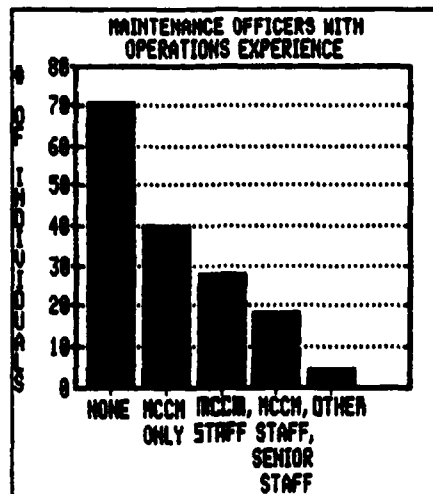


Figure 10. Missile Maintenance Officers' ICBM Operations Experience

Question #14 asked missile maintenance officers if they had had any experience in ICBM operations. The majority of missile maintenance officers had operations experience. Out of 161 respondents, 90 (55.9%) had some sort of previous experience in ICBM operations. 71 (44.1%) had no such experience. 40 (24.9%) had been MCCMs, 28 (17.4%) had been both MCCMs and staff officers, and 18 (11.1%) had been MCCMs, staff officers, and senior staff officers. Four individuals (2.5%) had been enlisted MCCMs on either the Atlas or Titan ICBMs. Figure 10 illustrates these findings. It would be intuitively tempting to believe that the experience of having served "on both sides of the house" would give those missile maintenance officers who had had previous missile operations experience a different outlook on the problems faced by operations personnel than their non-experienced contemporaries might have. These two groups' responses to various questions on the questionnaire were explored later in this chapter. Responses of



operations officers to Question #13 are also compared with these groups later in this chapter.

Enlisted survey respondents were also broken down demographically.

These respondents were assigned as shown:

Maintenance squadrons (FMMS & OMMS): 6 9-levels, 1 3167X, 2 44570  
Maintenance Control Division: 16 9-levels, 27 3167X, 8 44570  
Maintenance Support Division: 5 9-levels, 25 3167X, 2 44570  
Quality Control Division: 10 9-levels, 14 3167X, 11 44570  
Training Control Division: 12 9-levels, 16 3167X, 10 44570  
Worked directly for DCM: 6 9-levels, 1 3167X  
Assigned to other functions: 3 3167X, 4 44570

The 9-level supervisors generally held important positions within the maintenance complex. 26 were Maintenance Superintendents and 25 each were Branch Chiefs or NCOICs. The 3167X personnel were concentrated in the Maintenance Control and Maintenance Support Divisions, with smaller numbers in the Training Control Division (TTB instructors) and the Quality Control Division (QC&E evaluators and inspectors). The 44570 personnel were also found in the Training Control and Quality Control Divisions for the same reasons. A smaller number were assigned to the Maintenance Control Division. A few 7-levels worked directly for the DCM.

These NCOs formed the nucleus of supervision in the maintenance complex. As is demonstrated elsewhere in this Chapter, the officer maintenance personnel as a group had only a fraction of the Minuteman maintenance experience that these NCOs had, especially the 9-level senior enlisted supervisors.

Unfortunately, a dearth of NCOs has resulted in most of this experience being tied to desks at the wing instead being put to use out in the field. Maintenance teams were often led by junior enlisted.

TABLE III

QUESTION #12  
MONTHS IN PRESENT JOB

	< 6	6-12	12-24	24-36	> 36
missile maintenance officer	54	67	31	7	3
9-level	14	21	28	15	12
3167X	23	36	36	18	31
44570	25	21	20	12	5
operations senior staff	14	23	15	5	3
operations staff	15	27	45	11	6

Question #12 was designed to determine time individuals had been in their present job. The answers reflected a relatively high rate of turnover, especially among missile maintenance officers. 121 out of 162 missile maintenance officers who answered the question had been in their present position for less than one year, and 54 out of 162 had held their present position for less than 6 months. Only 10 had been in their present job for more than two years.

The answers to Question #13, "How many years (total) do you have in Minuteman maintenance?", reflected both the relative depth of experience among enlisted respondents and the relative lack of experience among officer respondents, regardless of career field.

TABLE IV

QUESTION #13  
YEARS IN MINUTEMAN MAINTENANCE

	None	< 2	2-4	4-6	6-10	> 10
missile maintenance officer	3	64	33	20	16	26
operations senior staff	55	0	3	1	1	0
operations staff	92	1	3	4	3	1
9-level	0	0	1	4	27	58
3167X	1	8	6	13	53	63
44570	1	2	15	5	37	24
MCCC	190	2	1	0	0	3
DMCCC	136	0	0	1	0	2

The above table demonstrates the relative lack of missile maintenance experience among officers of all AFSCs. 100 out of 164 missile maintenance officers (61%) have less than four year's experience. Among operations personnel, 12 out of 104 staff officers (11.5%) have some Minuteman maintenance experience. Five out of 60 senior staff officers (8.3%) have experience, while only 6 out of 196 MCCCs (3.1%) and 3 out of 139 DMCCs (2.2%) have experience. This is a significant contrast to question #14, in which 55.9% of responding missile maintenance officers stated that they had some sort of ICBM operations experience, mostly (24.9%) as MCCMs. This suggests a primarily one-way flow from operations to maintenance among Minuteman officer personnel. This can be partly explained by recalling that there are approximately 1400 MCCMs in the Minuteman weapon system compared to

approximately 210 missile maintenance officers of all ranks and all 31XX AFSCs. Adding approximately 240 operations staff and senior staff officers brings the officer operations-to-maintenance ratio to about 8:1 in favor of operations officers. It could be argued that the unequal ratio of maintenance officers with operations experience to operations officers with maintenance experience only reflects the ratio of operations officers to maintenance officers. This is because there are more operations officers who can retrain into maintenance than vice-versa.

#### Survey Responses: Comparison to Hypotheses

Hypotheses-to-Questions Correlations. Certain groups of questions were designed to measure different aspects of the respondents' attitudes towards the concept of MCCMs performing limited LCC maintenance. The questions were grouped as follows:

Opinions on the ability of MCCMs to perform maintenance: Questions #16, 18, 19, 20, 28, 30, 34, 38, and 41.

Opinions on the proposition that such maintenance would add to the workloads of the MCCMs and of the wings' training and evaluation agencies: Questions #24, 25, 26, 27, and 32.

Opinions on the proposition that such maintenance would degrade the performance and/or proficiency of MCCMs' primary LCC duties: Questions #37 and 39.

Opinions on the proposition that if MCCMs began to perform maintenance they would be given an increasing share of the maintenance workload over time, and would eventually come to be regarded as maintenance personnel: Question #42.

Questions designed to measure the respondents' opinion for or against the concept of MCCMs performing limited LCC maintenance: Questions #17, 22, 35, 36, 40; Questions #60-62 (to the extent that answer "a" for each question was the answer of choice).

Opinions on the degree of MCCM familiarity with drawer removal and replacement actions: Question #38.

Questions designed to solicit MCCM opinions on the type of maintenance guidelines that ought to go along with the concept of MCCMs performing limited LCC maintenance: Questions #43-46.

Questions designed to discover how MCCMs spent their time while on alert duty in the LCC: Questions #47-58.

Questions designed to solicit all respondents' opinions on the type of maintenance guidelines that ought to go along with the concept of MCCMs performing limited LCC maintenance: Questions #59-62.

Open-ended question designed to elicit additional comments about the concept of MCCMs performing limited LCC maintenance: Question #63.

#### Hypothesis 1

Hypothesis 1 consisted of a main hypothesis, that between an approximate range of between 51% and 67% of MCCM respondents would reject the concept, and several sub-hypotheses that amplified the main hypothesis. The criterion questions for Hypothesis 1 were Questions #17, 22, 35, 36, 40, and 60-63.

Question #17 stated that "Combat crews should not be tasked with maintenance. Operations and maintenance should not be mixed." 58% of MCCM respondents either tended to agree with or strongly agreed with this statement. 31.4% either tended to agree or strongly disagreed with this statement.

Question #22 stated that "The whole idea of capsule crews performing any maintenance is more trouble than it is worth.". Nearly 56% of MCCM respondents either tended to agree with or strongly agreed with this statement. 33.6% either tended to disagree or strongly disagreed with this statement.

The statement of question #35, "Capsule crews should stick to operations and leave maintenance to maintenance personnel.", generated the highest percentage of agreement of any of the questions #17-40.

59.5% of responding MCCMs either tended to agree with or strongly agreed with this statement. 32% either tended to disagree or strongly disagreed with the statement.

Question #36 stated that "The last thing I would want to do on an alert would be to perform maintenance.", and nearly 55% of MCCM respondents either tended to agree or strongly agreed with the statement. This was a slight drop in percentage from previous questions. Whether this drop is of any importance is impossible to determine from the available data; however, it is possible that some MCCMs could think of other actions that were "the last thing" that they would want to do on an alert. One respondent wrote that "The last thing that I would want to do on an alert would be to answer any more EAMs (Emergency Action Messages)." The percentage of respondents who tended to disagree or strongly disagreed with the statement remained relatively constant at 33%.

Question #40 stated that :

If my LCC had an inoperative computer, console, or status monitoring device; I would rather be authorized to remove and replace the bad drawer myself (and thereby fix the problem) than possibly wait several days for a "real" maintenance team to do it.

One respondent, a line MCCC, took exception to the phrase "several days" in the above statement, writing that no one would ever have to wait several days for a maintenance team. Two more respondents, a Flight Commander and a DOTI MCCC, wrote that they strongly agreed with this statement because they had been in precisely the situation described in

the above statement. Nearly 39% of respondents either tended to disagree with or strongly disagreed with this statement (disagreement with the statement of this question meant disapproval of the concept, just as did agreement with the statements in the previous questions). This was a decrease of 17-20% in respondents disagreeing with the concept. 47% of respondents tended to agree or strongly agreed with this statement, an increase in the percentage for approval of 14-16% over previous questions. The percentage of respondents who neither agreed nor disagreed increased by about 6%, to 17% of all responses. It is possible that MCCMs can better relate to the concept of LCC maintenance when it is presented to them in practical, familiar scenarios. It is also possible that MCCMs were comfortable with the idea of removing or replacing drawers but not with the idea of performing more involved maintenance.

Although Questions #60-62 were not "agree-disagree" questions as such, answer "a" to each of questions was "N/A, capsule crews should not perform maintenance". 51.9% of MCCM respondents answered "a" to Question #60, 48.5% answered "a" to Question #61, and 50.2% answered "a" to Question #62. The main hypothesis could be supported with survey data. The percentage of respondents who disapproved of the concept fell significantly below the hypothesized range for Question #40 only.

Answer Key for Questions #16-46:

- "A" - Strongly disagree with this statement.
- "B" - Tend to disagree with this statement.
- "C" - Neither agree nor disagree with this statement.
- "D" - Tend to agree with this statement.
- "E" - Strongly agree with this statement.

**QUESTIONS 17, 22, 35, 36, 40 AND 60-62**

**Sub-hypothesis 1A - MCCMs with Three or more Years on Crew.**

TABLE VI

Questions		Answers						
	A	B	C	D	E	Total	% D+E	
#17	11	20	12	16	34	93	53.8	
#22	13	24	4	11	40	92	55.4	
#35	11	21	10	13	38	93	54.8	
#36	9	23	11	14	36	93	53.8	
							% A+B	
#40	21	13	10	32	16	92	37.0	

	Other		Total	
	A	Answers	Responses	% A
#60	44	49	93	47.3
#61	41	52	93	44.1
#62	41	50	91	45.1



TABLE VII

## SUB-HYPOTHESIS 1A - MCCMS, LESS THAN 3 YEARS ON CREW

Questions		Answers						
	A	B	C	D	E	Total	% D+E	
#17	28	49	23	44	104	248	59.7	
#22	29	49	31	44	95	248	56.1	
#35	17	47	32	39	110	245	60.8	
#36	22	54	29	52	86	243	56.8	
							% A+B	
#40	52	47	39	68	37	243	40.7	

	Other		Total	
	A	Answers	Responses	% A
#60	130	113	243	53.5
#61	121	120	241	50.2
#62	124	113	237	52.3

TABLE VIII

## TABLE OF DIFFERENCES BETWEEN GROUPS

	% Rejecting by Group				
	< 3 yrs,	> 3 yrs	< 3 yrs	>	
#17	53.8	59.7	5.9		In every case, MCCMs with 3 or more years on crew rejected the concept by a smaller percentage. The average difference was 4.9%. The range was from .07% to 7.2%.
#22	55.4	56.1	0.7		
#35	54.8	60.8	6.0		
#36	53.8	56.8	3.0		
#40	37.0	40.7	3.7		
#60	47.3	53.5	6.2		
#61	44.1	50.2	6.1		
#62	45.1	52.3	7.2		

As can be seen from the above table, MCCMs with more than 3 years on crew disapproved of the concept by smaller percentages. However, for Questions #60-62, the percentage disapproving of the concept fell below 50% (47.3%, 44.1%, and 45.1%, respectively). For Question #40, the percentage disapproving fell lower, to 37%. Therefore, the first part of Sub-hypothesis 1A, that a smaller percentage of MCCMs with 3 or more years time on crew would disapprove of the concept, was supported by the survey responses. However, the second part of the hypothesis, that the

majority of this group would still disapprove of the concept, was not supported. These findings tend to support the idea that more experienced MCCMs have a greater tendency to approve of the concept.

Sub-hypothesis 1B - DMCCCs Rejecting the Concept. The hypothesis was that more DMCCCs than MCCCs would disapprove of the concept. The tables are shown below:

TABLE IX

DMCCCS' RESPONSES

Questions		Answers						
		A	B	C	D	E	Total	% D+E
#17		17	26	15	29	52	139	58.3
#22		19	31	18	23	51	139	53.2
#35		9	31	18	24	55	137	57.7
#36		11	33	19	25	49	137	54.0
								% A+B
#40		27	23	21	44	22	137	36.5

		Other		Total	
		A	Answers	Responses	% A
#60		69	67	136	50.7
#61		64	72	136	47.1
#62		67	66	133	50.4

TABLE X

MCCCS' RESPONSES

Questions		Answers						
		A	B	C	D	E	Total	% D+E
#17		22	41	20	31	82	196	57.7
#22		23	41	20	30	81	195	56.9
#35		20	35	24	28	88	195	59.5
#36		20	41	21	41	71	194	57.7
								% A+B
#40		45	35	28	55	30	193	41.5

		Other		Total	
		A	Answers	Responses	% A
#60		100	94	194	51.6
#61		94	99	193	48.7
#62		93	96	189	49.2

TABLE XI

## TABLE OF DIFFERENCES BETWEEN GROUPS

	! % Rejecting by Group! DMCCCs,			
	! % DMCCC	! % MCCC	! % >	
#17	58.3	57.7	0.6	In 6 out of 8 cases, MCCCs disapproved by a larger percentage than did DMCCCs. The average difference was 2.8%. The range was from .09% to 5%.
#22	53.2	56.9	- 3.7	
#35	57.7	59.5	- 1.8	
#36	54.0	57.7	- 3.7	
#40	36.5	41.5	- 5.0	
#60	50.7	51.6	- 0.9	
#61	47.1	48.7	- 1.6	
#62	50.4	49.2	1.2	

The hypothesis that more DMCCCs than MCCCs would disapprove of the concept was not supported. In 6 out of 8 questions, more MCCCs than DMCCCs disapproved. Tendency to approve or disapprove of the concept seemed more a function of time spent on crew than a function of whether the respondent was a MCCC or a DMCCC.

Explanation of Question #63 Analysis

Question #63 was an open-ended question designed to solicit comments from respondents. The comments from Question #63 were broken down into "generally in favor" and "generally opposed" groups. Each group was then further broken down into smaller groupings based on phrases and wording which the comments in a group had in common. The groupings used were:

Favorable to idea: (1) Specifically in favor of limited maintenance only (drawer R&R, tighten screws, change fuses, etc.).

(2) Implementation of this concept would save resources.

(3) Favorable to idea if MCCMs not called on to do diagnostic maintenance ("troubleshooting").

(4) Favorable to idea but there are problems with implementation that must be overcome.

(5) Favorable to idea, but idea is unworkable due to implementation problems.

(6) MCCMs should be trained in maintenance at a technical school such as Chanute AFB or Vandenberg AFB.

(7) Implementation of this concept would result in less LCC downtime.

(8) In order for this idea to work, spare parts would have to be stored at the LCF or in the LCC.

(9) Implementation of this concept would result in improved MCCM morale.

(10) Implementation of this concept would help to familiarize MCCMs with their weapon system.

(11) This is a good idea/ long overdue/ about time/ legalizes what goes on now.

(12) Maintenance team workload too great now - this would help maintenance out.

(13) Implementation of this concept would help prepare MCCMs to do vital maintenance in a wartime environment ("EWG/post-SIOP environment").

Opposed to Ideas: (1) Opposed because of the increased training burden that would be placed on MCCMs by this concept.

(2) Opposed because of the increased evaluation burden that would be placed on MCCMs by this concept.

(3) Opposed solely, or primarily, because of the possibility of being evaluated by DOV on maintenance tasks, and the consequent possible harm this might do the respondent's career.

(4) Operators should not do maintenance and vice-versa.

(5) It is beneath the dignity of a commissioned officer to perform maintenance.

(6) Being tasked with maintenance duties would degrade MCCMs' proficiency in their primary duties.

(7) Implementation of this concept would cause MCCMs to spend too much extra time in picking up equipment on base, removing and installing equipment, consulting with Job Control, and returning equipment to the base.

(8) SACMET (the SAC Management Engineering Team) would cut maintenance personnel manning.

In addition, there were some types of comments that neither favored nor opposed the concept per se but added insight into the types of specific problems that might have to be faced in order to implement the concept:

(1) If maintenance personnel inspect MCCM-performed maintenance, then maintenance personnel should just do it in the first place.

(2) There could be trouble if enlisted TTB or QC&E personnel are called upon to train and/or evaluate officer MCCMs.

(3) It would be a waste of resources to dispatch maintenance personnel to inspect MCCM-performed maintenance.

(4) Keep maintenance personnel out of the training and evaluation of MCCMs. Let DOTI and DOV do it.

(5) MCCMs are not picked for their maintenance aptitude and are not formally trained in maintenance. Some MCCMs may simply lack the aptitude to perform maintenance.

(6) MCCMs' workload in the LCC is so great that a third crew member should be added to handle the C<sup>3</sup> tasks.

(7) MCCMs' workload in the LCC is so great that SAC should return to the old 40-hour, 12-hours-on, 12-off concept of pre-1978 times.

Out of the MCCMs who answered Question #63, 73 made comments that fell into the "favor" group, while 158 made comments that fell into the "opposed" group. A total of 231 MCCMs answered Question #63, out of a total of 351 who responded to the questionnaire as a whole (percentage equal to 65.8%).

Sub-hypothesis 1C. It was assumed that many of the MCCMs who disapproved of the concept had specific reasons for doing so. If these reasons were discovered, an enumeration would have value for any future implementation. The hypothesis was that the most common reasons given by MCCMs for disapproval of the concept would be those listed above and discussed below.

A belief operations & maintenance should not be mixed on principle. Out of 158 MCCMs opposed to the concept, 11 responses fell into this category, for a percentage of 7%. Additionally, Questions #17 and #35 also fell into this category (opposed on principle). MCCMs tending to agree with or strongly agreeing with the statements of these questions were 58.2% and 59.5%, respectively.

TABLE XII  
QUESTIONS #17 AND #35 - MCCM RESPONSES

Questions	Answers					Total	% D+E
	A	B	C	D	E		
#17	37	66	34	58	133	328	58.2
#35	27	64	41	52	142	326	59.5

The disparity in percentages between Question #63 and Questions #17 and #35 could indicate that although many MCCMs felt this way, most had other, stronger reasons for disapproving of the concept.

A belief it is beneath an officer's dignity to perform maintenance. Only two MCCMs made statements that fell into this category (one SMS squadron commander and one SMS squadron executive officer also made such statements). This was a percentage of 1.3%.

An actual fear of the physical action of doing maintenance. No MCCMs stated they were afraid to perform maintenance. Six made statements to the effect that they were afraid that they might somehow break a piece of equipment and would then have to pay for it. This was a percentage of only 3.8%. However, this seemed to the researcher to be a valid issue that would have to be put to rest during any implementation of the concept. Several questions in the questionnaire fell into this area. The answer table for these questions is below.

TABLE XIII

## MCCM FEAR OF PERFORMING MAINTENANCE

Questions	Answers						
	A	B	C	D	E	Total	% D+E
#16	50	41	31	119	86	327	62.7
#18	92	73	69	61	33	328	28.7
#19	48	40	52	108	80	328	57.3
#20	69	92	51	60	56	328	35.4
#28	60	84	51	54	73	322	39.4
#30	72	128	52	31	42	325	22.5
#38	33	74	68	89	87	351	50.1
#41	66	100	43	70	71	350	40.3

Question #16: "Once they were properly trained, crew members could probably perform LCC maintenance as well as maintenance personnel do." Percentage agreeing, 62.7%. Percentage disagreeing, 27.9%. Most MCCMs thought they had the ability/aptitude to perform maintenance, although the nearly 28% who disagreed pointed up the need to confront this issue.

Question #18: "I would feel better about the idea of capsule crews performing LCC maintenance if I knew that maintenance or QC personnel would inspect the finished work." Percentage agreeing, 28.7%. Percentage disagreeing, 50.3%. The percentage of MCCMs who did not think the quality of their maintenance would be as good as that performed by maintenance personnel was within 1% of the percentage of MCCMs who desired that maintenance or QC&E personnel check their finished work (27.9% to 28.7%).

Question #19: "Work done by a maintenance-qualified capsule crew would not have to be inspected any more often than work done by anybody else." Percentage agreeing, 57.3%. Percentage disagreeing, 28.3%. The percentage opposed, 28.3%, is within the 27.9% to 28.7% range previously seen.

Question #20: "The quality of maintenance performed by a capsule crew would probably NOT be as good as the quality of the maintenance performed by maintenance personnel." Percentage agreeing, 35.4%. Percentage disagreeing, 49.1%. 15.5% had no opinion. Because of the construction of the question (ie, agreeing with this statement meant disagreement with the concept and vice-versa) percentages were more skewed towards opposition. However, the percentage of MCCM respondents who believed they could perform quality maintenance still closely approached 50%.

Question #28: "I would be uncomfortable knowing that capsule crews were removing and replacing equipment in the LCC, whether or not they were trained and authorized to do so." Percentage agreeing, 39.4%. Percentage disagreeing, 44.7%. Although the percentage of MCCMs who thought they could do maintenance had declined relative to those opposed over the last two questions, the former still outnumbered the latter, if only by slightly over 5%.

Question #30: "A capsule crew performing maintenance would probably do a poor job and end up causing even more work for maintenance personnel." Percentage agreeing, 22.5%. Percentage disagreeing, 61.5%. Possibly some MCCMs perceived the tone of this statement as provocative, and therefore came to the defense of their profession. The difference in percentages for this question was the widest of any of this group of questions.

Question #38: "Removing or replacing a drawer on a command and control console would be a very different kind of task than anything else I do while on alert in the LCC." Percentage agreeing, 50.1%.



Percentage disagreeing, 30.5%. Only a MCCM who had less than one year's time on crew could truly agree with this statement, since MCCMs performed R&R actions on certain LCC electronic equipment drawers in conjunction with certain procedures performed on a roughly annual basis. In other words, it could reasonably be assumed that most MCCMs had performed an R&R action on a drawer at some point during their time on crew. The seeming discrepancy between the percentage agreeing with the statement and the reality of the situation was interesting. Perhaps some MCCMs took the question to mean "different than what I do everyday while on alert".

Question #41: "I would be uncomfortable with the idea of performing maintenance such as that described in Question #40, even if I were authorized and trained to do so." Question #40 described a scenario in which the MCCM has a choice of either removing and replacing a bad drawer that was degrading his LCC's capabilities, or waiting for a maintenance team to come out to the LCC. Percentage agreeing, 40.3%. Percentage disagreeing, 47.4%. As in the previous questions, the percentage of MCCM respondents who thought they would be capable of performing quality maintenance was greater than the percentage who thought they were not capable of such actions.

There seemed to be two separate bodies of opinion on the issue of MCCM capability to perform maintenance. The larger group believed MCCMs could do an adequate job of performing R&R LCC maintenance. The smaller group disagreed. The existence of the larger group demonstrated that a large number of MCCMs believed they were trainable. The existence of the smaller group demonstrated a definite "people problem."

A belief that MCCMs should perform no more maintenance than other operations personnel did - especially aircrews. Only five MCCMs made statements that fell into this category. Since all used almost identical wording, it could be concluded this was a "buzz-phrase" among some MCCMs opposed to the concept. The percentage for this group was 3.2%. This group did not seem to represent any distinct and significant body of belief opposed to the concept.

A fear crews would be evaluated on maintenance tasks during scheduled Standardization Evaluations (see definitions under "DOV"), or that DOV Evaluator MCCMs would check other MCCMs' work in the LCC. The fear of evaluations may have been the single greatest reservation that MCCMs had about the concept. Fully 52.5% of Question #63 respondents who opposed the concept (83 out of 158) mentioned fear of more frequent or more intense DOV Evaluations as a factor (or as THE factor) in their opposition. Twenty-seven out of 319 MCCMs answered "F" ("Other") to Question #62 ("MCCMs who performed LCC maintenance should be evaluated by..."). Twenty of these 27 wrote "No checks!" or similar statements.

A fear that increased training would mean decreased time off which is perceived by MCCMs as being at a premium. Out of 158 responses to Question #63 that fell into the "opposed" group, 34 (21.5%) mentioned an increase in time spent in training. These respondents usually stated that increased training would entail adding an extra day of training to the monthly schedule. The consensus was that the extra time would be taken directly from regular time off and therefore would not be welcome.

TABLE XIV

## QUESTION #42

## Answers

GROUPS	A	B	C	D	E	Total	% D+E
all MCCM	20	49	46	97	134	346	66.8
MCCC	8	25	22	51	87	193	71.5
DMCCC	9	20	21	39	46	135	63.0
DOT/DOV	4	13	9	20	39	85	69.4
> 3 yrs	4	13	7	29	39	92	73.9
< 3 yrs	14	33	37	63	94	241	65.2
Previous							
Maintenance	1	3	1	8	4	17	70.6
Grand Forks	5	9	8	25	33	55	60.0

A fear that an increasing number of maintenance tasks would be loaded onto MCCMs with the result being that MCCMs would come to be regarded as maintenance personnel. MCCMs answering this statement were broken down into several categories to better investigate how attitudes toward the statement might have been affected by job, time on crew, and previous maintenance experience. Question #42 directly addressed this issue - "Once MCCMs were tasked with maintenance, they would be given more and more maintenance to do, with the result that MCCMs would eventually be regarded as maintenance personnel." At least 60% of MCCMs in all categories agreed with this statement. The highest percentage agreeing was 73.9% of MCCMs with three or more years time on crew. The lowest was 60% of MCCMs at Grand Forks AFB. The mean was 67.6%.

The categories, ranked by percentage from highest to lowest, were:

MCCMs with three or more years time on crew, 73.9%  
 All MCCCs, 71.5%  
 MCCMs with previous maintenance experience, 70.6%  
 MCCMs assigned to DOTI or DOV, 69.4%  
 --- 67.6%, the mean ---  
 All MCCMs, 66.8%  
 MCCMs with less than three years time on crew, 65.2%  
 All DMCCCs, 63%  
 ALL Grand Forks MCCMs, 60%

Grand Forks MCCMs may have had such a relatively low percentage because their exposure to the Project Teamwork program familiarized them with the concept of MCCMs performing LCC maintenance and thus removed some misconceptions. Interestingly, the four categories that scored above the mean were the categories of more experienced MCCMs - the MCCCs, with more time on crew than the populations of MCCMs as a whole; the MCCMs with ICBM maintenance experience; the MCCMs with three or more years time on crew; the DOTI and DOV MCCMs with their assumed greater degree of knowledge about the weapon system. The total of MCCMs with maintenance experience was only 17 individuals, and with such a small number the statistical validity was questionable.

TABLE XV  
QUESTION #32  
Answers

GROUPS	A	B	C	D	E	Total	% D+E
all MCCM	30	74	64	67	91	326	48.5
MCCC	22	39	40	41	53	196	48.0
DMCCC	9	36	26	26	40	139	47.5
> 3 yrs	9	26	19	18	21	93	41.9
< 3 yrs.	20	52	47	50	76	245	51.4
DOT/DOV	5	18	16	15	32	86	54.7
Previous Maintenance	3	5	5	1	3	17	23.5
Grand Forks	5	19	7	13	14	58	46.6

A belief that the existing workload is too heavy to allow for maintenance by MCCMs. Of MCCMs who answered Question #63, 158 were in the "opposed" category, and 100 of these (63.3%) made statements to the effect that they did not have time to perform maintenance tasks in the LCC. Most of these respondents mentioned the recently installed C<sup>3</sup>/AFSATCOM equipment as being a great drain on their time.

Additionally, Question #32 stated "Capsule crews really don't have the time while out on alert to perform any maintenance" (Table XV).

Only two categories of MCCMs had a greater than 50% agreement percentage, MCCMs with less than three years on crew (51.4%), and MCCMs assigned to DOTI or DOV (54.7%). DOTI and DOV MCCMs often had an inordinate amount of office work such as lesson plans and evaluation scripts. These MCCMs often attempted to accomplish some of their work while on alert. Other MCCMs did not share this workload. This bringing of work out from "the office" to the LCC could probably account for the percentage of DOTI and DOV personnel who felt overworked on alert. The overall mean was 45.26%. The small percentage (23.5%) of MCCMs with maintenance experience who agreed with the statement demonstrates the inherent unreliability of small sample populations. The adjusted mean with this small group excluded was 48.7%, which probably more closely reflected reality. Only 5% more MCCCs than DMCCCs agreed with the statement, but the percentage of MCCMs with three or more years on crew who agreed was 10% less than the percentage of other MCCMs who agreed. In the "all MCCMs" category, only 48.5% of respondents agreed with this statement.

A fear that performing maintenance would degrade MCCM proficiency in their primary duties. There were 14 MCCM respondents who answered Question #63 with statements that fell into this category (8.86% of "opposed" respondents). Two other questions, #37 and #39, also addressed this issue. Question #37 stated that: "Performing maintenance and being trained in maintenance tasks would degrade my performance in my primary duties" (Table XVI).

TABLE XVI  
QUESTION #37

Answers

GROUPS	A	B	C	D	E	Total	% D+E
all MCCM	35	87	39	73	117	351	54.1
MCCC	18	48	19	40	69	196	55.6
DMCCC	11	32	20	29	45	139	53.2
> 3 yr	9	26	10	17	31	93	51.6
< 3 yr	20	37	29	53	84	243	56.4
DOV/DOI	4	23	7	16	36	86	60.5
Previous Maintenance	2	7	1	4	3	17	41.2
Grand Forks	6	12	9	9	21	58	51.7

TABLE XVII  
QUESTION #39

Answers

GROUPS	A	B	C	D	E	Total	% D+E
all MCCM	30	101	47	80	93	351	49.3
MCCC	18	52	26	41	57	196	55.6
DMCCC	7	43	20	33	34	139	53.2
> 3 yr	10	26	14	16	27	93	46.2
< 3 yr	16	70	32	60	65	243	51.4
DOV/DOI	4	27	5	23	27	86	58.1
Previous Maintenance	1	8	3	3	2	17	29.4
Grand Forks	5	16	9	11	16	58	46.6

In every case except that of the MCCMs with previous maintenance experience, over 51% of the MCCMs in each category agreed with the statement of Question #37. The percentages were fairly tightly grouped with a range of 51.7% to 56.4% except for DOI and DOV MCCMs. The 60.5% agreement percentage for this group could probably be explained by the large amount of extra material that these MCCMs must learn in order to be competent Instructors and Evaluators. The percentage of Grand Forks MCCMs who agreed was comparatively low, although still above 50%. Question #39 stated that "Performing simple maintenance tasks while on

alert would take time away from my performance of other essential duties" (Table XVII).

Once again, the percentage for MCCMs with previous maintenance experience was at variance with the range distribution for other categories, with 29.4% agreed. The mean (without MCCMs with previous maintenance experience) was 51.4%. Grand Forks MCCMs were below average in percentage agreed (46.6%) and only a minority of Grand Forks MCCMs agreed with the statement. An even smaller percentage (46.2%) of MCCMs with over three years time on crew agreed with the statement. As in Questions #32 and #37, MCCCs agreed with the statement by a higher percentage than did DMCCCs (55.6% to 53.2%).

A fear that more time would be spent on an alert tour because of maintenance actions. Only three out of 158 Question #63 "opposed" respondents (1.9%) made comments that fell into this category. This small percentage did not seem to make up a significant enough grouping of opinion to pose any problem to the implementation of the proposal.

A belief that there would not be enough of a requirement to perform LCC drawer R&R actions to justify the work of setting up the program. The fact that only two respondents out of 158 made comments that fell into this category (1.3%) demonstrates that MCCMs did not see the lack of such a requirement as a reason not to implement the concept.

A belief that implementation would cause friction between operations and maintenance personnel. Five respondents out of 158 made this type of comment (3.2%). MCCMs apparently did not see this as a reason to oppose implementation.

A belief that implementation would seriously damage MCCM morale.

Thirteen respondents out of 158 made this type of comment (8.2%). Less than 10% of "opposed" respondents made this type of comment, which might suggest that MCCMs who felt this way might have already had morale problems due to other factors.

A significant number (approximately 10%) of MCCMs opposed to the concept would request that a third crewmember be added to help with a recently increased communications workload (due to the recent installation of AFSATCOM equipment). Fourteen out of 158 "opposed" respondents to Question #63 made this type of comment, for a percentage of 8.9%. While the conditions of the hypothesis were not met since less than 10% of respondents made this comment, there was a measurable percentage of respondents who felt this way. This may have been an indication that at least some MCCMs found it hard to cope with the new AFSATCOM equipment. The question of whether or not this was merely a learning curve phenomenon was outside the scope of this study.

At least 5% of MCCMs opposed would state that the old 40-hour alert concept should be reinstated. Only one respondent made this type of comment, possibly because MCCMs on the crew force in 1983-1984 did not remember the 40-hour alerts, which ceased in 1977-78.

A belief that SACMET would cut maintenance manning levels if this proposal were to be implemented. Only one MCCM made this type of comment. Respondents in other categories made this type of comment with more frequency, as will be seen later. As a rule, MCCMs had little contact with SACMET since SMS squadrons as a rule were not subject to periodic SACMET audits. Possibly, many MCCMs may not have even known of the existence of SACMET.



TABLE XVIII  
SUB-HYPOTHESIS 1D

Questions		Answers												
		A	B	C	D	E	Total	% D+E						
#17		7		21		8		14		36		86		58.1
#22		11		15		7		9		43		85		61.2
#24		0		0		2		14		40		56		96.4
#25		2		1		1		3		25		32		87.5
#35		4		18		9		16		39		86		64.0
#36		3		23		7		18		35		86		61.6
														% A+B
#40		23		12		12		27		12		86		40.7

		Other		Total				
		A	Answers	Responses	% A			
#60		44		42		86		51.2
#61		41		45		86		47.7
#62		39		44		83		47.0

Sub-hypothesis 1D. The hypothesis was that MCCMs assigned to DOTI or DOV would not differ significantly in percentages for and against the proposal (approximately 5%). The table of questions and answers for DOTI/DOV MCCMs is Table XVIII above.

The percentages of DOTI/DOV MCCMs who either tended to agree with or strongly agreed with each questions' statement were compared to the percentages for all MCCMs answering the same questions. For Question #17, the percentage difference between DOTI/DOV MCCMs and all MCCMs was .1%. For Question #22, the difference expanded to 5.2%, barely in excess of the hypothesized level. The difference for Question #35 was 4%. For Question #36, the difference was 6.9% (61.6% for DOTI/DOV MCCMs vs 54.7% for all MCCMs). For Question #40, the difference was only 1.8%. The differences for Questions #60-62 ("a" answers) were .7%, .8%, and 3.2%, respectively. For Question #62, 47% of DOTI/DOV respondents answered "a" compared to 50.2% of all MCCMs. While the 5.2% difference of Question

#22 is barely significant, the 6.9% difference of Question #36 should be examined. This was the "The last thing I would want to do on alert would be to perform maintenance" question. 61.2% of DOTI/DOV MCCMs agreed, against 56% of all MCCMs. This difference could probably be explained by the DOTI and DOV MCCMs' comparatively heavier workload on alert, which was discussed previously. Although the parameters of the hypothesis were not strictly met, it would be safe to say that in general, all MCCMs tend to have the same opinions in roughly the same percentages, regardless of what job they do.

TABLE XIX  
SUB-HYPOTHESIS 1E

Questions	Answers					Total	% D+E
	A	B	C	D	E		
#21	47	23	41	134	83	328	66.2
#23	52	46	46	106	77	327	56.0
#29	55	62	95	81	29	322	34.2
#31	41	55	45	121	63	325	56.6
#33	53	63	74	102	34	326	41.7

Sub-hypothesis 1E. The hypothesis was that MCCMs who approved of the proposal would do so with the caveats enumerated in Chapter 2 and broken out below.

A belief that the Initial Qualification Training given at Vandenberg AFB to officers who were in training to become MCCMs should be extended to include drawer removal and replacement familiarization training. Six out of 73 respondents to Question #63 who favored the concept mentioned this idea, as did four respondents who answered "h" ("Other") to Question #61. The Question #63 percentage was 8.2%.

A belief that LCC maintenance by MCCMs should be limited to simple removal and replacement of electronic equipment drawers, tightening

handles and screws, and so on. Out of 73 "in favor" respondents to Question #63, 45 or 61.6% made this sort of comment. It would probably be safe to say that the idea that maintenance by MCCMs would only be limited to simple drawer R&R tasks and similar simple actions is assumed to be a "given" by the majority of MCCM personnel who favor the concept.

A belief that LCC maintenance by MCCMs should only be performed with the approval and active cooperation of Job Control. Only two of the 73 "in favor" MCCM respondents to Question #63 made this type of comment; however, seven more MCCMs made similar statements in the comments sections of Questions #59-62. It would seem to be intuitively obvious that Job Control and/or the appropriate maintenance shops at the wings would be consulted by MCCMs performing any LCC maintenance, since such over-the-phone or by-radio consultations are standard operating procedures for maintenance teams performing maintenance in the missile field.

A belief that implementation of the proposal would save maintenance resources; principally fuel and maintenance manhours. Nineteen of the 73 "in favor" MCCM respondents to Question #63 made this type of comment (26%). Additionally, Questions #21, #23, #29, #31, and #33 addressed this issue to some degree.

Question #21 stated that "Capsule crews might help to decrease the maintenance workload if they were tasked with performing some types of LCC maintenance." Percentage agreeing was 66.2%. Percentage disagreeing was 21.3%. Comment: Almost 2/3 of MCCMs agree with this general statement.

Question #23 stated that "Capsule crews could help decrease LCC

equipment downtime if they were authorized to remove and replace certain equipment drawers in the LCC." Percentage agreeing was 56%. Percentage disagreeing was 30%. Comment: Percentage agreeing was down and percentage disagreeing was up for this more specific statement. Perhaps the apprehension of some MCCMs concerning the performance of maintenance played a part in this increase.

Question #29 stated that "If maintenance personnel weren't always having to remove and replace drawers in the LCC, they could get to the more involved maintenance sooner." Percentage agreeing was only 34.2%. Percentage disagreeing was 36.3%. The percentage answering that they neither agreed nor disagreed with the statement was 29.5%. Comment: The relatively equal percentages in all categories suggested that many MCCMs did not feel strongly enough about the subject to express an opinion. The relatively equal agree-disagree percentages made it impossible to discover a definitive "MCCM attitude" for this statement.

Question #31 stated that "If capsule crews performed some of the LCC maintenance, then maintenance personnel wouldn't have to make as many trips to the LCCs." Percentage agreeing was 56.6%. Percentage disagreeing was 29.5%. Comment: There may have been a body of opinion that expressed the idea that MCCMs on alert in the LCC want as few "visitors" as possible. Not having to escort a maintenance team inside the LCC could be one reason some MCCMs would prefer to do their own maintenance if possible.

Question #33 stated that "If capsule crews were maintenance qualified, maintenance resources could be allocated more effectively." Percentage agreeing was 41.7%. Percentage disagreeing was 35.6%.

Percentage who neither agreed nor disagreed was 22.7%. Comment: This statement did not seem to develop a distinctive "MCCM attitude", possibly because this subject did not directly impact upon MCCMs in their everyday duties.

A belief that MCCMs would not be capable of performing troubleshooting since they had not been trained in maintenance troubleshooting techniques. Only two of the MCCMs who responded to Question #63 made this type of comment.

A belief that "people problems" associated with implementation would inhibit the practicality of the proposal. A total of 34 MCCM "in favor" respondents to Question #63 made this type of comment (46.6%). This percentage points up the consciousness among MCCMs that there are problems that would have to be dealt with in any implementation of the concept. The specific problems mentioned are all discussed elsewhere in this chapter, and included but were not limited to fear of performing maintenance, fear that conflicting channels of authority would burden MCCMs on alert, fear of becoming maintenance personnel, and fear of more evaluations.

A belief that exposure to maintenance would broaden the horizons of MCCM officers. Only two of the "in favor" MCCMs of Question #63 mentioned this idea. Both had previous experience in Titan II operations.

A belief that exposure to maintenance would result in job enrichment for MCCMs. This idea was prevalent in the literature. No MCCMs made comments which fell into this category.

A measurable percentage (approximately 5%) of MCCMs who approved of

the proposal would suggest that the "40-hour" alert system used prior to 1978 be reinstated so that one crew would be in the LCC for only 12 hours instead of for 24 hours. One MCCM made this comment, for a percentage value of 1.4%. Thus this hypothesis could not be supported. Once again, it could be that MCCMs on crew in 1983-1984 do not remember the old "40-hour" alert system.

TABLE XX  
SUB-HYPOTHESIS 1F

Questions	Answers					Total	% D+E
	A	B	C	D	E		
#44	24	10	26	80	207	347	82.7
#45	25	8	24	74	217	348	83.6
#46	59	87	69	65	69	349	38.4

Sub-hypothesis 1F. The hypothesis was that approximately 75% of all MCCMs who responded to the survey would answer either "d" ("tend to agree") or "e" ("strongly agree") to Questions #44 and #45. These questions dealt with MCCM authority to control LCC maintenance while on alert. Less than 50% would answer "d" or "e" to Question #46, which dealt with inspection of completed maintenance by maintenance personnel. The question and answer table for Questions #44-46 is Table XX.

Question #44 stated that "I would be more comfortable with the idea of performing simple LCC maintenance if I had the authority to delay performing such maintenance if I personally thought that some other duty was more important right then." Percentage agreeing was an impressive 82.7%. Percentage disagreeing was 9.8%.

Question #45 stated that "I would be more comfortable with the idea of performing simple LCC maintenance if clear-cut lines of authority were understood by everybody involved, so that I would not be given

conflicting orders by Job Control, DO agencies, and my squadron." Percentage agreeing was 83.6%. Percentage disagreeing was 9.5%.

Question #46 stated that "I would be more comfortable with the idea of performing simple LCC maintenance if the completed work that I had done was always inspected by qualified maintenance personnel as soon as possible." Percentage agreeing was 38.4%. Percentage disagreeing was 41.8%. The percentage who neither agreed nor disagreed was 19.8% which was the highest percentage for answer "c" in this series of three questions. Less than 40% of MCCMs respondents felt that their work would need inspection as soon as possible. However, only about 42% felt that their maintenance would not need fast followup inspection.

#### Hypothesis 2

Hypothesis 2 was that MCCMs with either Titan II operations experience or some type of maintenance experience would oppose the proposal by 15-20% less than other MCCMs because their previous exposure to maintenance would make them less anxious about performing maintenance. The question and answer tables for MCCMs with previous maintenance experience are Tables XXI and XXII.

For each question, the agreement percentage for MCCMs with previous maintenance experience was less than 50%. The percentage for all MCCMs was greater than 50% in 6 out of 8 cases. The requirements of the hypothesis were met for all questions with the exception of Question #17 where the difference was only 12.6%. If Question #17 is considered to be an outlier, then the terms of the hypothesis are met. The hypothesis that MCCMs with previous maintenance experience were less likely to be opposed to implementation cannot be disproved.

TABLE XXI

## MCCMs WITH PREVIOUS MAINTENANCE EXPERIENCE

Questions	Answers					Total	% D+E
	A	B	C	D	E		
#17	1	4	5	2	5	17	41.2
#22	3	7	2	1	4	17	29.4
#35	1	7	2	4	3	17	41.2
#36	2	4	5	3	3	17	35.3
							% A+B
#40	1	1	2	8	5	17	11.8

	Other		Total	
	A	Answers	Responses	% A
#60	5	12	17	29.4
#61	5	12	17	29.4
#62	5	12	17	29.4

TABLE XXII, which compares the percentages for MCCMs with previous maintenance experience with the percentages for all MCCMs for the questions in Table XXI, is shown below. In every case, the percentage of MCCMs with previous maintenance experience is lower than the percentage for other MCCMs.

TABLE XXII

## TABLE OF DIFFERENCES BETWEEN GROUPS

Column A			Column B			
% approved concept - all MCCMs			% approved concept - MCCMs w/ prev.anx.			% Col. A - Col. B
#17	53.8		41.2		12.6	
#22	55.4		29.4		26.0	
#35	54.8		41.2		22.6	
#36	54.5		35.3		19.2	
#40	39.0		11.8		27.2	
#60	51.6		29.4		22.2	
#61	48.9		29.4		19.5	
#62	50.3		29.4		20.9	



### Hypothesis 3

The hypothesis was that the majority of all operations staff officers (1835 AFSC) and operations senior staff officers (1816 AFSC) would approve of the proposal (at least 55%). The following table provides percentages for the relevant questions. Questions #36 and #40 were not included as those questions applied to MCCMs only.

TABLE XXIII

(for Hypotheses 3, 3A, and 3C)  
OPERATIONS SENIOR STAFF PERSONNEL (1816 AFSC)

Questions	Answers					Total	% A+B	% D+E
	A	B	C	D	E			
#17	11	16	4	11	18	60	45.0	48.3
#22	16	17	6	9	12	60	55.0	35.0
#35	12	12	8	11	17	60	40.0	46.7

	Other		Total	% A
	A	Answers	Responses	
#60	20	40	60	33.3
#61	20	40	60	33.3
#62	18	40	58	31.0

TABLE XXIV

OPERATIONS STAFF PERSONNEL (1835 AFSC)

Questions	Answers					Total	% A+B	% D+E
	A	B	C	D	E			
#17	25	22	13	16	28	104	45.2	42.3
#22	25	28	11	17	23	104	51.0	38.5
#35	21	21	16	12	32	102	41.2	43.1

	Other		Total	% A
	A	Answers	Responses	
#60	39	64	103	37.9
#61	34	69	103	33.0
#62	34	62	96	35.4

The percentage approval rate for operations staff and operations senior staff exceeded 50% only for Question #22. The conditions of the

hypothesis were met only by operations senior staff personnel answering Question #22 (55% approval). Thus there was no evidence to support this hypothesis. In practical terms, this meant that there was less than expected support for the concept among these personnel. The percentages of "approval" answers for Questions #17, #22, and #35, and the "disapproval" percentages for Question #60, #61, and #62 were nearly parallel for both groups of respondents. The widest variance was 4.6%, for Question #60. This demonstrated a close agreement between the attitudes of operations staff and senior staff officers. Although the conditions of the hypothesis were not met, the data showed that opposition to the concept was less among these two groups than among MCCMs.

Sub-hypothesis 3A. The hypothesis was that at least 10% more of the operations senior staff respondents would approve of the concept than would operations staff officers. This would tend to support the idea that the senior staff officers' greater breadth of experience would cause them to favor the proposal by a wider margin. As with Hypothesis 3, the largest difference percentage of agreement between senior staff and staff officers was only 4.6%, far from the 10% needed to support this hypothesis. Therefore, no evidence exists to support this hypothesis. Only 8 out of 60 operations senior staff officers had any ICBM maintenance experience (13.3%). Possibly, breadth of experience played no part in senior staff attitudes because this group may have had little breadth of experience.

Sub-hypothesis 3B. The hypothesis was that at least 20% more operations senior staff officers with maintenance experience would favor

the idea than would operations senior staff officers who lacked maintenance experience. The assumption was that maintenance experience would be associated with a greater tendency to favor the proposal. Since only eight senior staff officers had maintenance experience, it was impossible to prove or disprove this hypothesis due to the high probability that eight individuals will not represent the attitudes of a population with any statistical accuracy. Tables XXV and XXVI, comparing answers for senior staff officers with and without maintenance experience are shown below.

TABLE XXV

OPERATIONS SENIOR STAFF PERSONNEL WITH MAINTENANCE EXPERIENCE

Questions	Answers						
	A	B	C	D	E	Total	% A+B
#17	3	1	1	1	2	8	50.0
#22	3	2	0	1	2	8	60.0
#35	3	0	1	1	3	8	37.5

	Other		Total	
	A	Answers	Responses	% A
#60	3	5	8	37.5
#61	3	5	8	37.5
#62	3	5	8	37.5

TABLE XXVI

OPERATIONS SENIOR STAFF PERSONNEL WITHOUT MAINTENANCE EXPERIENCE

Questions	Answers						
	A	B	C	D	E	Total	% A+B
#17	8	15	3	10	16	52	44.2
#22	13	15	6	8	10	52	53.9
#35	9	12	7	10	14	52	40.4

	Other		Total	
	A	Answers	Responses	% A
#60	17	35	52	32.7
#61	17	35	52	32.7
#62	15	35	50	30.0

TABLE XXVII  
SUB-HYPOTHESIS 3C

	Column A % disapproved - all MCCMs	Column B % disapproved - all ops staff	% Col. A - Col. B
#17	58.2	42.3	15.9
#22	56.0	38.5	17.5
#35	60.0	43.1	16.9
#60	51.9	37.9	14.0
#61	48.5	33.0	15.5
#62	50.2	35.4	14.8

Sub-hypothesis 3C. The hypothesis was that due to their relatively recent experience as MCCMs, the operations staff officers would parallel MCCM feelings about the proposal by within 5%. The following table demonstrates that this hypothesis could not be supported, based upon survey responses from operations staff officers and from MCCMs. The smallest percentage difference between the two groups for any question was 14% for Question #60, nearly twice the hypothesized 5%. These results and those of Hypothesis 3 demonstrate that operations staff officers' attitudes toward this proposal tend to parallel the attitudes of senior staff officers and not the attitudes of MCCMs.

Sub-hypothesis 3D. The hypothesis was that more operations staff officers who work in the Codes Division (D09) would favor the proposal than would operations staff officers who worked in other DO agencies such as Plans and Intelligence (D022) and Trainer Operations (DOTM). This would be because Codes Division officers had more contact with maintenance.

TABLE XXVIII

## OPERATIONS STAFF OFFICERS ASSIGNED TO CODES DIVISION (D09)

Questions	Answers							
	A	B	C	D	E	Total	% A+B	
#17	10	7	6	4	6	33	51.5	
#22	12	10	3	4	4	33	66.7	
#35	9	5	8	2	8	32	43.8	

	Other		Total		% A
	A	Answers	Responses		
#60	9	24	33		27.3
#61	8	25	33		24.2
#62	8	22	30		26.7

TABLE XXIX

## OPERATIONS STAFF NOT ASSIGNED TO CODES DIVISION (D09)

Questions	Answers							
	A	B	C	D	E	Total	% A+B	
#17	15	15	7	12	22	71	42.3	
#22	13	18	8	13	19	71	43.7	
#35	12	16	8	10	24	70	40.0	

	Other		Total		% A
	A	Answers	Responses		
#60	30	40	70		42.9
#61	26	44	70		37.1
#62	26	40	66		39.4

The assumption was that since D09 personnel work with maintenance personnel on a daily basis, and since a large part of D09's work relationship with MCCMs involves LCC drawer removal and replacement, D09 officers would be more familiar with maintenance and would therefore be less apprehensive about the concept. Other operations staff officers have comparatively little association with maintenance in their work, and would therefore tend to be more apprehensive about the concept. The above tables demonstrated that for all questions the D09 staff officers approve of the concept by a greater percentage than did other staff

officers. The range in differences in percentages varied from 3.8% for Question #35 to 23% for Question #22. The mean percentage difference (all questions) was 12.87%. Thus the hypothesis that there was a direct positive relationship between exposure to maintenance and a tendency to favor the idea of MCCMs performing maintenance could not be disproven.

Sub-hypothesis 3E. The hypothesis was that operations senior staff and operations staff officers would cite the same reasons as MCCMs for either favoring or opposing the proposal. In general, this was true, though the different types of comments varied in frequency which reflected the operations staff and senior staff officers' unique outlook. An examination of staff and senior staff officer comments from Question #63 showed the following comments:

Senior Staff Officer (1816 AFSC) "In Favor" comments:

Minor maintenance (R&R drawers, tighten screws, etc) OK - 12 out of 19 "in favor", or 63.2%.

Good idea in principle, but no more DOV evaluations - 4 out of 19, or 21.5%.

Would save maintenance resources - 3 out of 19, or 15.8%.

Good idea in principle, but MCCMs feel overworked/are overworked now - 3 out of 19, or 15.8%.

Would familiarize MCCMs with the Minuteman weapon system - 2 out of 19, or 10.5%.

It's about time/Should be implemented immediately - 2 out of 19, or 10.5%.

Good idea in principle, but MCCMs are overworked and this idea not needed at all bases - 1 out of 19, or 5.3%.

Would improve MCCMs' morale - 1 out of 19, or 5.3%.

Good idea in principle, but spare parts would have to be pre-positioned at LCFs or LCCs - 1 out of 19, or 5.3%.

Good idea in principle, but might degrade MCCMs' proficiency in primary

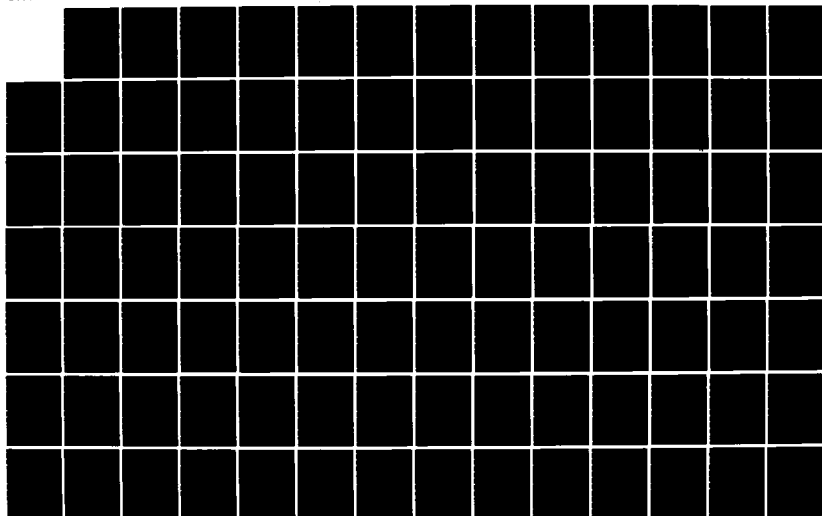
AD-A146 933

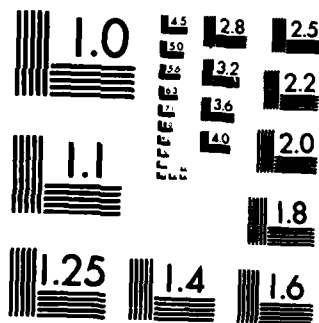
ANALYSIS OF THE PROPOSED USE OF MINUTEMAN MISSILE  
COMBAT CREW MEMBERS AS (U) AIR FORCE INST OF TECH  
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST... C L BURDSAL  
SEP 84 AFIT/GLM/LSM/84S-7 F/G 5/9

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duties and place increased workload on DOTI and DOV - 1 out of 19, or 5.3%.

Senior Staff Officer (1816 AFSC) "Opposed" Comments:

MCCMs have no time to perform maintenance - 8 out of 16, or 50%.

Would place a heavier training burden on the MCCMs - 4 out of 16, or 25%.

Would place a heavier evaluation burden on MCCMs - 3 out of 16, or 18.8%.

Would degrade MCCMs' proficiency in primary duties - 3 out of 16, or 18.8%.

Would be beneath officers' dignity - 1 out of 16, or 6.3%.

SACMET would cut maintenance manning - 1 out of 16, or 6.3%.

Operators should not do maintenance on principle - 1 out of 16, or 6.3%.

Would cause friction between maintenance and operations personnel (jurisdictional disputes and "finger-pointing") - 1 out of 16, or 6.3%.

MCCMs lack aptitude to perform maintenance - 1 out of 16, or 6.3%.

Staff Officer (1835 AFSC) "In Favor" Comments:

Minor maintenance (drawer R&R, tighten screws, etc.) OK - 10 out of 34, or 29%.

It's about time/should be implemented immediately - 7 out of 34, or 20.6%.

Would conserve maintenance resources - 5 out of 34, or 14.7%.

Good idea, train MCCMs in maintenance during IQT at Vandenberg - 3 out of 34, or 8.8%.

Good idea, but don't evaluate maintenance tasks - 4 out of 34, or 11.8%.

Good idea, but there would be "people problems" during and after implementation - 4 out of 34, or 11.8%.

Good idea, but SACMET will try to cut maintenance manning - 1 out of 34, or 2.9%.

Good idea, would improve MCCM morale - 1 out of 34, or 2.9%.

Good idea, but not all MCCMs may be capable of performing maintenance tasks - 1 out of 34, or 2.9%.

Staff Officer (1835 AFSC) "Opposed" Comments:

MCCMs do not have time to perform LCC maintenance - 16 out of 27, or 59.3%.

Would place a heavier training burden on the MCCMs - 4 out of 27, or 14.8%.

Would place a heavier evaluation burden on the MCCMs - 4 out of 27, or 14.8%.

Would degrade MCCMs' proficiency in their primary duties - 3 out of 27, or 11%.

Beneath an officer's dignity - 2 out of 27, or 7.4%.

Operators should not do maintenance on principle - 2 out of 27, or 7.4%.

Aircrews do not perform maintenance, therefore MCCMs shouldn't either - 2 out of 27, or 7.4%.

Would lower MCCMs' morale - 2 out of 27, or 7.4%.

Not enough drawer R&R goes on to justify implementation - 2 out of 27, or 7.4%.

SACMET would cut maintenance manning - 1 out of 27, or 3.7%.

MCCMs are so overworked that a third crew member should be added just to handle the C<sup>2</sup> workload - 1 out of 27, or 3.7%.

MCCMs do not need another area to be evaluated in - 1 out of 27, or 3.7%.

Would place an increased burden on DOTI and DOV - 1 out of 27, or 3.7%.

Too many MCCMs could not perform maintenance tasks competently - 1 out of 27, 3.7%.

Hypothesis 4

The hypothesis was that the majority of Missile Maintenance Officers (31XX AFSCs) would favor the proposal, specifically, at least 55% of these officers would favor the proposal. The question and answer table for the hypothesis is Table XXX below:

TABLE XXX

## ALL MISSILE MAINTENANCE OFFICERS

Questions	Answers					Total	% A+B
	A	B	C	D	E		
#17	51	52	22	27	17	169	61.0
#22	55	55	22	17	18	170	64.7
#35	47	48	27	22	21	168	56.6

	Other		Total	
	A	Answers	Responses	% A
#60	27	141	168	16.1
#61	24	144	168	14.3
#62	21	140	161	13.0

For Questions #17, #22, and #35, the percentages of respondents who disagreed with the statements (and therefore approved of the concept of MCCMs performing LCC maintenance) was greater than 55% in each case. For Questions #60-#62, only 16.1%, 14.3%, and 13%, respectively, of respondents believed that MCCMs should not perform LCC maintenance. Thus, Hypothesis 4 could not be disproven.

Sub-hypothesis 4A. The hypothesis was that Missile Maintenance Officers with ICBM operations experience would tend to favor the proposal by a percentage of at least 15% more than would other Missile Maintenance Officers.

TABLE XXXI

## MISSILE MAINTENANCE OFFICERS WITH ICBM OPERATIONS EXPERIENCE

Questions	Answers					Total	% A+B
	A	B	C	D	E		
#17	37	27	6	18	8	96	66.7
#22	37	30	9	11	8	96	70.0
#35	33	26	11	11	1	94	62.8

	Other		Total	
	A	Answers	Responses	% A
#60	14	82	96	14.6
#61	11	85	96	11.5
#62	11	82	93	10.4

TABLE XXXII

## MISSILE MAINTENANCE OFFICERS WITHOUT ICBM OPERATIONS EXPERIENCE

Questions		Answers							
		A	B	C	D	E	Total	% A+B	
#17		13	26	16	9	9	73	53.4	
#22		19	26	14	6	9	74	60.8	
#35		15	23	15	10	11	74	51.4	

		Other		Total		
		A	Answers	Responses	% A	
#60		13	59	72	18.1	
#61		11	61	72	15.3	
#62		9	51	60	13.2	

TABLE XXXIII

## TABLE OF COMPARISON

Column A			Column B			% Col. A - Col. B
% approved			% approved			
- w/ exper.			- w/o exper.			
#17	:	66.7	:	53.4	:	13.3
#22	:	70.0	:	60.8	:	9.2
#35	:	62.8	:	51.4	:	11.4
#60	:	14.6	:	18.1	:	3.5
#61	:	11.5	:	15.3	:	3.8
#62	:	10.4	:	13.2	:	2.8

As can be seen from the above tables, at no time was there a difference of at least 15% in the approval percentages of the two groups. Therefore Sub-hypothesis 4A could not be supported from survey data. However, for Questions #17, #22, and #35, the approval percentages for respondents with operations experience exceeded the same percentages for respondents without such experience by a minimum of 9.2%. For Questions #60-#62 the percentage of respondents who answered that MCCMs should not perform LCC maintenance was always greater for respondents without operations experience by a minimum of 2.8%. Therefore it was

possible to state that although the technical conditions of the hypothesis were not met, the probability that Missile Maintenance Officers with ICBM operations experience were slightly more inclined to favor the idea than were other Missile Maintenance Officers could not be discounted.

Sub-hypothesis 4B. The hypothesis was that more Missile Maintenance Officers in grades Second Lieutenant to Captain would disapprove of the proposal than would Missile Maintenance Officers in grades Major to Colonel by approximately 10%. The assumption was that the difference could be attributed to the idea that the more senior officers would have a greater breadth of experience than the more junior officers, and that this would increase the tendency to approve of the proposal. The question and answer tables for the two groups are shown below:

TABLE XXXIV

MISSILE MAINTENANCE OFFICERS, SECOND LIEUTENANT TO CAPTAIN

Questions		Answers						
		A	B	C	D	E	Total	% D+E
#17		27	46	18	19	13	123	26.0
#22		34	43	20	14	12	123	21.1
#35		26	39	23	16	17	121	27.3

		Other		Total	
	A	Answers	Responses	% A	
#60	23	98	121	19.0	
#61	18	105	121	14.9	
#62	18	97	115	15.7	

TABLE XXXV

## MISSILE MAINTENANCE OFFICERS, MAJOR TO COLONEL

Questions	Answers						Total	% D+E
	A	B	C	D	E			
#17	26	7	3	9	3		48	25.0
#22	24	13	3	3	5		48	16.7
#35	23	10	4	6	4		47	21.3

	Other		Total		% A
	A	Answers	Responses		
#60	4	44	48		8.3
#61	4	44	48		8.3
#62	2	46	48		4.2

The disapproval rate for Lieutenants and Captains exceeded the rate for Majors through Colonels by 10% or more on only two of the six questions (10.7% for #60 and 11.5% for #62). For Question #17, the difference was only 1%. The mean percentage difference was 6.7%. Therefore the hypothesis could not be supported from survey data. The second half of this hypothesis was that Lieutenants and Captains with ICBM operations experience would favor the proposal by approximately 67%, again due to their relatively greater breadth of experience.

TABLE XXXVI

MISSILE MAINTENANCE OFFICERS, LIEUTENANTS & CAPTAINS,  
WITH OPERATIONS EXPERIENCE

Questions	Answers						Total	% A+B
	A	B	C	D	E			
#17	14	20	4	12	5		55	61.8%
#22	16	19	6	9	6		55	63.6%
#35	13	17	7	9	8		54	56.0%

	Other		Total		% Not A
	A	Answers	Responses		
#60	12	43	55		78.2%
#61	10	45	55		81.8%
#62	10	42	52		80.8%

For Questions #60-#62, the percentage of respondents who did not choose answer "a" ("N/A, capsule crews should not perform maintenance.") was greater than 67% in each case. The minimum was 78.2% for Question #60. For Questions #17, #22, and #35 the percentages disagreeing with the statements were 61.8%, 63.6%, and 56%, respectively. Five of the six percentages approached or exceeded 67%; therefore the hypothesis that junior Missile Maintenance Officers with ICBM operations experience would approve the concept by approximately 67% could not be discounted. The approval and "not 'a'" percentages for these questions for all junior Missile Maintenance Officers were 59.4%, 62.6%, 53.7%, 81%, 86.8%, and 84.4%, respectively. The first three percentages were less than those for officers with operations experience; the last three percentages were greater. The importance, if any, of these differences in percentages between the two groups could not be determined from survey data and is probably a fairly minor issue.

Sub-hypothesis 4C. The sub-hypothesis was that Missile Maintenance Officer respondents to Question #63 would tend to make the same types of comments as MCCMs, operations staff, and operations senior staff officers made. Further, at least 10% of Missile Maintenance Officers who disapproved of the proposal would cite as a justification for disapproval a fear that MCCMs would not be capable of performing an acceptable level of quality maintenance. Out of 83 comments, 67 or 80.7% were "in favor" of the concept of MCCMs performing limited LCC maintenance. The listings of the comments of Missile Maintenance Officers respondents, both for and against the proposal, are discussed at length on the following pages:

**Missile Maintenance Officers "In Favor" Comments:**

Minor maintenance such as drawer R&R is OK - 52 out of 67, or 77.6%.

Long overdue/Implement immediately - 14 out of 67, or 20.9%.

Would save maintenance resources - 13 out of 67, or 19.4%.

Good idea but there are problems with it - 8 out of 67, or 11.9%.

- SACNET would cut maintenance manning - 1
- might degrade MCCMs' proficiency in primary duties - 1
- might be problems if enlisted inspect MCCMs' LCC maintenance - 1
- other (not explained) - 5

Good idea in principle, but "people problems" would hinder or prevent successful implementation - 4 out of 67, or 6%.

Give MCCMs maintenance training at Vandenberg or Chanute - 3 out of 67, or 4.5%.

Would lessen LCC downtime - 3 out of 67, or 4.5%.

Would familiarize MCCMs with weapon system - 3 out of 67, or 4.5%.

Good idea, but don't dispatch maintenance personnel to an LCC solely to inspect MCCMs' maintenance - 3 out of 67, or 4.5%.

Good idea, but MCCMs do not need more evaluations - 2 out of 67, or 3%.

Good idea, but not all MCCMs have aptitude to perform maintenance - 2 out of 67, or 3%.

Each of the following comments was made by one individual:

- MCCMs would need advice from Job Control
- if maintenance personnel inspect MCCMs' LCC maintenance, then maintenance personnel should do the maintenance in the first place
- lack of spare parts is more relevant than any lack of maintenance personnel
- good idea because LCC maintenance at my base is more than my personnel can keep up with
- keep enlisted personnel out of MCCM training and evaluations because enlisted personnel should not evaluate officers

**Missile Maintenance Officer "Opposed" Comments:**

Not enough of a need to justify implementation - 6 out of 16, or 37.5%.

Would increase the training burden on MCCMs - 4 out of 16, or 25%.

Would increase the evaluation burden on MCCMs - 4 out of 16, or 25%.



Operators should not perform maintenance on principle - 4 out of 16, or 25%.

Would cause too much friction between maintenance and operations personnel - 4 out of 16, or 25%.

MCCMs do not have time during alerts to do maintenance - 3 out of 16, or 18.8%.

Would cause an increased burden on TTB and QC&E - 2 out of 16, or 12.5%.

Lack of spare parts more relevant than any lack of maintenance personnel - 2 out of 16, or 12.5%.

MCCMs might lack aptitude to perform maintenance - 2 out of 16, or 12.5%.

Each of the following comments was made by one individual:

- would degrade MCCMs' proficiency in their primary duties
- MCCMs do not need more things to be evaluated on
- if maintenance personnel have to inspect MCCMs' maintenance, then maintenance personnel should do it in the first place
- don't dispatch maintenance teams to an LCC just to inspect MCCMs' maintenance

In general, the above comments were similar to those made by operations personnel. Some specific comments were made more often by this group than by others, and some comments were made less often. The percentage of "opposed" comments that mentioned the idea that MCCMs may not be capable of performing maintenance was only 12.5% (2 out 16 respondents). Therefore, the conditions for both parts of the hypothesis were satisfied. The hypothesis could not be disproved from survey data. The implications are discussed in Chapter IV.

#### Hypothesis 5

The hypothesis was that a majority (approximately 55%) of enlisted maintenance supervisors would favor the proposal. The question and answer table for this hypothesis (Table XXXVII) is shown below:

TABLE XXXVII

## COMBINED ENLISTED SUPERVISOR RESPONSES (ALL AFSCs, 7- &amp; 9-LEVEL)

Question	Answers						
	A	B	C	D	E	Total	% A+B
#17	76	96	42	47	57	318	54.1
#22	109	98	39	36	34	316	65.5
#35	91	98	39	37	42	307	61.6

	Other		Total		% A	% not A
	A	Answers	Responses			
#60	65	250	315	20.6	79.4	
#61	50	264	314	15.9	84.1	
#62	42	255	297	14.1	85.9	

The only approval percentage out of the six questions that was less than 55% was the 54.1% for Question #17. Thus the hypothesis could not be disproven.

Sub-hypothesis 5A. The hypothesis was that 3167X personnel (ENT and E-Lab technician supervisors) would approve of the concept by approximately 67%. The assumption was that this would be due to a perceived lessening of the 3167X workload by the 3167X personnel. The question and answer table for the hypothesis is shown below in Table XXXVIII:

TABLE XXXVIII

## ENLISTED SUPERVISORS - 3167X AFSCS

Question	Answers						
	A	B	C	D	E	Total	% A+B
#17	42	52	21	17	12	144	65.3
#22	56	52	20	6	10	144	75.0
#35	48	55	20	7	10	140	73.6

	Other		Total		% A	% not A
	A	Answers	Responses			
#60	18	125	143	12.6	87.4	
#61	13	130	143	9.1	90.9	
#62	10	131	141	7.1	92.9	

The approval percentage for Question #17, at 65.3%, was the only approval percentage that was less than 67%. The percentages for Questions #61 and #62 exceeded 90%, demonstrating strong support for the concept among this group. The hypothesis could not be disproven.

Sub-hypothesis 5B. The hypothesis was that a majority of 44570 enlisted supervisors (approximately 55%) would tend to be neutral concerning the proposal. The assumption was that this would be due to a perception by these personnel that drawer removal and replacement would be of only peripheral value for the type of heavy maintenance they performed. The question and answer table for the hypothesis is shown below.

TABLE XXXIX  
ENLISTED SUPERVISORS - 44570 AFSC

Question	Answers									
	A	B	C	D	E	Total	% A+B	% D+E	% C	
#17	13	17	14	18	28	84	33.7	54.8	16.7	
#22	20	22	13	17	12	84	50.0	34.5	15.5	
#35	14	20	13	14	18	79	43.0	40.5	16.5	

		Other		Total			
	A	Answers	Responses	% A	% not A		
#60	24	58	82	29.3	70.7		
#61	18	64	82	22.0	78.0		
#62	16	61	77	20.8	79.2		

In no case did the percentage of respondents answering "c" ("Neither agree nor disagree with this statement") exceed 17%. Therefore the conditions of the hypothesis were not met, and the hypothesis could not be supported with survey data. It was possible that there was no firm attitude among respondents concerning the concept of MCCMs performing LCC maintenance. For example, a majority (54.8%) of

respondents agreed with the statement of Question #17, 50% disagreed with the statement of Question #22, and there was no clear-cut majority for Question #35. However, when offered a clear chance to reject the concept in Questions #60-#62, answer "a", a maximum of 29.3% chose answer "a". This demonstrated that most 44570 supervisors did not firmly reject the concept of MCCNs performing LCC maintenance.

Sub-hypothesis 5C. The hypothesis was that approximately 20% more 9-level senior enlisted supervisors (31699, 44599, 99601 AFBCs) would favor the proposal than would 3167Xs and 44570s. The assumption was that the relatively greater breadth of experience, time in ICBM maintenance, and more time spent in associating with operations personnel over the years would be associated with a greater tendency to favor the proposal. The question and answer tables for the hypothesis are shown below.

TABLE XL

SENIOR ENLISTED SUPERVISORS ("9-LEVEL")

Questions		Answers						
		A	B	C	D	E	Total	% A+B
#17		22	28	8	13	19	90	55.6
#22		33	25	6	13	12	89	65.2
#35		29	24	6	16	14	89	59.6

		Other		Total			
		A	Answers	Responses	% A	% not A	
#60		23	67	90	25.6	74.4	
#61		19	70	89	21.4	78.7	
#62		16	66	82	19.5	80.5	

TABLE XLI

## COMPARATIVE "APPROVAL" PERCENTAGES FOR 9-LEVELS, 3167X, &amp; 44570

Questions % A+B Answers				% not A Answers			
	9-1vl	3167X	44570		9-1vl	3167X	44570
#17	55.6	65.3	35.7	#60	74.4	87.4	70.7
#22	65.2	75.0	50.0	#61	78.7	90.9	78.0
#35	59.6	73.6	43.0	#62	80.5	92.9	79.2

The table immediately above demonstrated that rather than exceeding the "approval" percentages for the 7-level AFSCs, the 9-level percentages fell between the 44570 and the 3167X percentages in every case. For every question, the 9-level percentage was greater than the 44570 percentage (a maximum of 19.9% greater, at Question #17) and the 9-level percentage was less than the 3167X percentage. Therefore it was concluded that the hypothesis could not be supported from survey data. The above table demonstrated that a tendency to approve of the concept of MCCMs performing LCC maintenance was more a function of where an individual worked or of AFSC than a function of breadth of experience.

Hypothesis 6

The hypothesis was that of all respondents in every category for Question #59, more would choose answer "g" ("No inspection is necessary if the equipment works properly.") than would choose any other answer. The assumption was that there would be a general belief, common to all categories of respondents, that MCCMs would perform the same level of "quality maintenance" on a drawer R&R task as a regular maintenance team would. It was further assumed that supporting evidence for the hypothesis would be that over 50% of respondents would choose answer "a" or "b" for Questions #18, #20, #30, and #34; and that over 50% of respondents would choose answer "d" or "e" for Questions #16 and #19.

These questions all pertained to MCCMs' ability to perform maintenance. The table below shows Question #59 answer "g" as a percentage of the total number answering for each group.

TABLE XLI.  
QUESTION #59 - ALL RESPONDENTS

Groups	B	Other Answers	Total Responses	% B
MCCMs	129	195	324	39.8
Operations				
Senior	28	31	59	47.5
Staff				
Operations				
Staff	54	47	101	53.5
Junior				
31XX	47	69	116	40.5
Senior				
31XX	22	22	44	50.0
9-level	57	83	140	40.7
3167X	34	54	88	38.6
44570	17	64	81	21.0

TABLE XLIII  
QUESTION #59

Answers

	B	C	D	E	F	G	H	REST?
all MCCM	44	19	0	11	44	129	47	Y
DOTI/DOV	9	4	0	3	10	42	13	Y
>36 months	11	4	0	4	16	32	13	Y
Operations								
Senior	5	7	0	1	3	28	8	Y
Staff								
Operations								
Staff	5	5	1	5	11	54	14	Y
Junior								
31XX	7	12	5	3	15	47	20	Y
Senior								
31XX	3	1	1	0	1	22	15	Y
9-Level	2	9	4	2	13	34	21	Y
3167X	4	16	4	4	12	57	35	Y
44570	3	20	1	1	18	17	14	N

Table XLIII above shows the number of individuals for each answer of Question #59 by group. The right-hand column asks whether that group chose answer "g" more than any other answer.

Every group except the 44570 group chose answer "g" more than any other answer. The 44570s chose answer "c" most frequently, answer "f" the next most frequently, and then answer "g". The meanings of each answer are examined later in this chapter. Since not all groups chose answer "g" more than any other answer, the technical conditions of the hypothesis were not met. However, since all but one group chose answer "g" more often than any other answer, it could be argued that there is a definite body of opinion, distributed through all groups of respondents, that MCCMs could perform "quality maintenance."

TABLE XLIV  
RESPONDENTS APPROVING

	D+E #16	A+B #18	D+E #19	A+B #20	A+B #28	A+B #30	A+B #34
all MCCM	62.7	50.3	57.3	49.1	44.7	61.5	45.5
Operations							
Senior	61.0	38.3	60.0	56.7	60.0	73.3	51.7
Staff							
Operations							
Staff	71.9	37.9	62.5	58.7	60.4	76.5	53.9
Junior							
31XX	63.8	30.8	64.1	51.3	64.7	64.7	55.7
Senior							
31XX	65.2	35.6	71.7	58.7	75.6	80.0	66.7
9-Level	73.6	33.3	68.8	58.3	78.0	77.3	63.1
3167X	60.0	38.2	58.9	54.4	62.9	61.1	54.4
44570	48.2	24.1	48.8	37.4	55.1	51.9	27.9

The second half of the hypothesis was that over 50% of respondents would choose answers for Questions #16, #18-#20, #28, #30, and #34 that meant approval of the concept. For Question #16 and #19 this meant that over 50% of respondents would choose either answer "d" or answer "e".

For the remainder of the questions, over 50% of the respondents would choose either answer "a" or answer "b". The question and answer table for the hypothesis is shown below, followed by an explanation of the data.

Question #16 stated that "Once they were properly trained, crew members could probably perform LCC maintenance as well as maintenance crews do." At least 60% of each group agreed, with the exception of 44570s where 48.2% agreed. The small percentage for 44570s could have been due to the nature of the heavy maintenance that this group performed; it may have been hard for 44570s to visualize MCCMs performing such maintenance while on alert.

Question #18 stated that "I would feel better about the idea of capsule crews performing LCC maintenance if I knew that maintenance or QC personnel would inspect the finished work." MCCMs were the only group that had a majority in disagreement with this statement. In all other groups, a larger percentage desired that MCCMs' maintenance be inspected at some future time. This result seemed to challenge the idea that the groups have confidence that MCCMs could perform competent maintenance. In light of the percentage responses to Question #19, the percentages for Question #18 were enigmatic.

Question #19 stated that "Work done by a maintenance-qualified capsule crew would not have to be inspected any more often than work done by anybody else." In every group except the 44570s, at least 60% of respondents agreed with this statement. The 44570 percentage was 48.8%, possibly for the reasons suggested earlier. The wide "approval" percentage difference between Questions #18 and #19 may have been due to



the phrase "maintenance-qualified capsule crew" in Question #19. Some respondents agreeing with the statement in Question #18 may have made the assumption that Question #18 was referring to non-qualified MCCs, and therefore agreed with the idea that maintenance by non-qualified personnel should always be inspected.

Question #20 stated that "The quality of maintenance performed by capsule crews would probably NOT be as good as the quality of the maintenance performed by maintenance personnel." 49.1% of MCCMs and 37.4% of 44570s disagreed with this statement; in all other groups at least 51% disagreed. The fact that less than 50% of MCCMs disagreed correlated with the fact that a majority of MCCMs disapproved of the concept of MCCMs performing LCC maintenance.

Question #28 stated that "I would be uncomfortable knowing that capsule crews were removing and replacing equipment in the LCC, whether or not they were trained and authorized to do so." Only 44.7% of MCCMs disagreed with this statement, possibly because a majority of MCCMs disapproved of the concept. In all other groups a majority disagreed with the statement. 55% of 44570s disagreed, 75.6% of field grade 31XXs disagreed, and 78% of 9-level enlisted senior supervisors disagreed. Most respondents seemed more comfortable with the concept when the phrase "trained and authorized" was used.

Question #30 stated that "A capsule crew performing maintenance would probably do a poor job and end up causing even more work for maintenance personnel." A majority of all groups disagreed with this statement. The smallest majority was 51.9% for 44570s. The largest was 80% for field grade Missile Maintenance Officers (the largest percentage

for the entire hypothesis). This response could be seen as strong support for the idea that most personnel would have confidence in the quality of MCCM-performed LCC maintenance.

Question #34 stated that "If capsule crews replaced certain drawers in equipment racks, a mandatory inspection by qualified maintenance personnel should always follow." 45.5% of MCCMs and 27.9% of 44570s disagreed with this statement; in all other groups at least 51% disagreed.

All groups except for MCCMs and 44570s had 6 questions with percentages greater than 50%, and one with percentages less than 50% (Question #18). MCCMs had 4 questions with percentages greater than 50%, and three with less than 50%. 44570s had only two questions with percentages greater than 50% (#28 and #30) and five with percentages less than 50%.

The conditions of the hypothesis, that no "approval" percentages would be less than 50%, were not satisfied; therefore the hypothesis could not be supported from survey data. However, the responses showed that with the exception of 44570s, whose work would be only slightly impacted by an implementation of the concept, and of MCCMs, a majority of whom disapproved of the concept, there was strong support for implementation and confidence in MCCM ability to do good maintenance.

Hypothesis 6 was the last formal hypothesis. The following data is included for purposes of intergroup comparisons.

The question and answer table for DOTI/DOV MCCM responses to Questions #24, #25, #26, and #27 which was shown earlier in this chapter is reprinted below, so that the responses could be compared to those of

other groups of respondents. Questions #24 and #25 were addressed only to DOTI and DOV MCCMs and to TTB and QC&E personnel. Question #24 stated that "The training of capsule crews in maintenance tasks would probably impose a greater workload on my work center." Question #25 stated that "The inspection and evaluation of capsule crews who performed LCC maintenance tasks would probably impose a greater workload on my work center." Question #26 stated that "The training of capsule crews who performed LCC maintenance could impose a burden on wing training functions that would be all out of proportion to any possible gains that might result from such a program, at least in the short term." Question #27 stated that "The evaluation of capsule crews who performed LCC maintenance could impose a burden on wing evaluation functions that would be all out of proportion to any possible gains that might result from such a program, at least in the short term." Comparison of the percentages of respondents in each group who agreed with the statements showed significant differences of opinion between operations and maintenance personnel on the topics presented by these questions. The applicable tables are Tables XLV through LII below:

TABLE XLV

DOTI AND DOV MCCM

Questions		Answers							
		A	B	C	D	E	Total	% D+E	
#24		0	0	2	14	40	56	96.4	
#25		2	1	1	3	25	32	87.5	
#26		4	13	8	14	46	85	70.6	
#27		3	10	12	14	44	83	69.9	

TABLE XLVI

## TTB AND QC&amp;E PERSONNEL

Questions	Answers							
	A	B	C	D	E	Total	% D+E	
#24	1	0	5	9	9	24	66.7	
#25	2	4	5	8	8	27	59.3	
#26	3	11	19	9	9	51	39.3	
#27	4	16	16	7	5	51	23.5	

TABLE XLVII

## MCCMS NOT ASSIGNED TO DOTI OR DOV

Questions	Answers							
	A	B	C	D	E	Total	% D+E	
#26	13	34	38	62	86	233	63.5	
#27	15	23	32	66	97	233	70.0	

TABLE XLVIII

## OPERATIONS STAFF AND SENIOR STAFF PERSONNEL

Questions	Answers							
	A	B	C	D	E	Total	% D+E	
#26	19	43	18	43	38	163	49.7	
#27	20	35	22	46	38	163	51.5	

TABLE XLIX

## MISSILE MAINTENANCE OFFICERS

Questions	Answers							
	A	B	C	D	E	Total	% D+E	
#26	25	53	33	37	18	168	32.7	
#27	26	64	25	35	16	168	30.4	

TABLE L

## SENIOR ENLISTED MAINTENANCE SUPERVISORS ("9-LEVELS")

Questions	Answers						
	A	B	C	D	E	Total	% D+E
#26	19	34	10	17	9	90	28.9
#27	16	39	7	14	11	90	27.8

TABLE LI

## ENLISTED MAINTENANCE SUPERVISORS ("7-LEVELS") - 44570 AFSC

Questions	Answers						
	A	B	C	D	E	Total	% D+E
#26	7	22	25	17	8	84	29.8
#27	6	28	21	16	8	84	28.6

TABLE LII

## ENLISTED MAINTENANCE SUPERVISORS ("7-LEVELS") - 3167X AFSCs

Questions	Answers						
	A	B	C	D	E	Total	% D+E
#26	26	55	35	18	7	144	17.4
#27	24	62	30	19	6	144	17.4

The table below (Table LIII) shows the responses of different groups of operations and maintenance personnel to Question #32, which stated that "Capsule crews really don't have the time while out on alert to perform maintenance." MCCM responses to this statement were detailed earlier in this chapter. Of the groups of maintenance personnel respondents, only the 44570 respondents agreed with the statement by a percentage of more than 10%. Of all groups, only DOTI/DOV MCCMs agreed with the statement by a percentage of more than 49%. These results demonstrate the diversity of opinions among respondents about how MCCMs spend their alert time in the LCC.

TABLE LIII

QUESTION #32  
ALL RESPONDENTS

## Answers

	A	B	C	D	E	Total	% D+E
all MCCM	30	74	64	67	91	326	41.9
DOTI/DOV	5	18	16	15	32	86	54.7
>36 months	9	26	19	18	21	93	48.5
Operations							
Senior Staff	12	17	11	11	9	60	33.3
Operations Staff	26	35	15	14	12	102	25.5
Junior 31XX	54	35	20	7	4	120	9.2
Senior 31XX	26	13	6	1	1	47	4.4
31XX with Operations	49	27	9	2	3	90	5.6
Junior 31XX Operations	28	17	5	1	2	54	5.9
9-Level	33	33	16	7	1	90	8.9
3167X	60	48	27	5	1	141	4.3
44570	18	22	20	9	9	78	23.1

Question #43: MCCM Responses. Question #43 was directed to MCCMs only. It stated that "MCCMs who were being trained to perform maintenance tasks would have to be given the same hands-on training maintenance personnel receive." 80.5% of MCCM respondents agreed with this statement, as did 94.1% of MCCMs who had maintenance experience. Grand Forks MCCMs, who had at least theoretically been exposed to the concept because of Project Teamwork, the percentage agreed by 84.2%. The table for responses by all MCCMs is shown below.

TABLE LIV

## MCCM RESPONSES TO QUESTION #43

## Answers

	A	B	C	D	E	Total	% D+E
all MCCM	14	28	26	108	173	349	80.5
MCCM with maintenance experience	1	0	0	9	7	17	94.1
Grand Forks	2	4	3	13	35	57	84.2

Questions #59-#62: Responses other than "A". Of interest to any implementation effort would be the answers of survey respondents to such questions as "who should inspect?", "should all MCCMs be trained?", "who should train the MCCMs?", "who should evaluate?". Questions #59-#62 addressed these issues. Question #59 stated that "If capsule crews performed LCC maintenance, the completed maintenance should always have to be inspected by:". "

TABLE LV

## Question #59

## Answers

	A	B	C	D	E	F	G	H
all MCCM	30	44	19	0	11	44	129	47
DOTI/DOV	11	9	4	0	3	10	42	13
>36 months	6	11	4	0	4	16	32	13
Operations								
Senior	7	5	7	0	1	3	28	8
Staff								
Operations								
Staff	6	5	5	1	5	11	54	14
Junior								
31XX	7	7	12	5	3	15	47	20
Senior								
31XX	2	3	1	1	0	1	22	15
9-Level	3	2	9	4	2	13	34	21
3167X	8	4	16	4	4	12	57	35
44570	7	3	20	1	1	18	17	14
Totals	87	93	97	16	34	143	462	1132
% total	7.7%	8.2%	8.6%	1.4%	3.0%	12.6%	40.8%	17.7%

Answer "a" was "The next capsule crew, and later by the Flight Commander." 7.7% chose this answer. Some respondents lined through "...and later by the Flight Commander." These responses were included under answer "h" ("Other"). Answer "b" was "Qualified maintenance personnel only." 8.2% chose this answer. Answer "c" was "QC&E maintenance personnel." 8.6% chose this answer. Answer "d" was "DOTI or DOV personnel." Only 1.4% chose this answer. Answer "e" was "a and d above", which only 3.0% chose. Answer "f" was "b and c above". 12.6% chose this answer. Answer "g" was "No inspection is necessary if the equipment works properly." 40.8% of all respondents chose this answer. Answer "h" was "Other." Included in this category were comments that "a & c" were a good answer, comments that in effect said the same thing as answer "g", the group of "a" answers mentioned above, and comments to the effect that MCCMs should not perform maintenance. Another frequent comment, made mostly by operations senior staff, enlisted respondents, and by field grade missile maintenance officers, was that most maintenance performed by maintenance teams in the field was not inspected (at least not on an ASAP basis) and that MCCM-performed maintenance should not have to be inspected every time either. Another comment made by some enlisted respondents was that MCCMs should be made Certified Maintenance Inspectors. Altogether these totaled 17.7% of responses

Question #60. Question #60 that stated that "If capsule crews performed LCC maintenance". Answer "a" ("N/A, crews should not perform maintenance.") was discussed previously in this chapter. The answers are explained below the table.



TABLE LVI

## QUESTION #60

## Answers

	B	C	D	
all MCCM	110	19	26	
DOTI/DOV	29	3	10	
>36 months	37	5	7	
with				
maintenance	10	2	0	
experience				
operations				
senior	32	1	6	
staff				
operations				
staff	55	4	5	
junior				
31XX	74	5	15	
senior				
31XX	33	3	5	
9-Level	50	3	14	
3167X	104	5	16	
44570	46	1	10	
Totals	580	51	114	745
% total	77.9%	6.9%	15.3%	100%

Answer "b" was "All crews should be trained to perform all of the assigned maintenance tasks." This was by far the most popular choice of the three. 77.9% of respondents chose answer "b". Answer "c" was "Only certain crews should be trained to perform maintenance." 6.9% chose this answer. Answer "d" was "Other". 15.3% chose this answer. Most of these made comments to the effect that all MCCMs should be trained to perform only those tasks that the DO and DCM together had decided that MCCMs could and should perform.

Question #61. Question #61 stated that "Capsule crews who were being trained to perform maintenance should be trained by:". Answer "a" ("N/A, crews should not perform maintenance.") was discussed previously in this chapter. The answers are explained below the table.

TABLE LVII

## QUESTION #61

## Answers

	B	C	D	E	F	G	H
all MCCM	4	20	37	19	47	20	16
DOTI/DOV	1	9	10	4	14	3	4
>36 months	2	8	13	6	11	5	7
operations							
senior	9	4	7	4	10	2	3
staff							
operations							
staff	7	10	21	4	15	9	3
junior							
31XX	10	15	17	12	23	17	6
senior							
31XX	7	12	3	2	8	5	4
9-Level	10	10	9	6	14	10	11
3167X	15	27	18	20	26	13	11
44570	0	8	18	14	14	15	4
Totals	65	123	153	91	182	99	782
% total	8.3%	15.7%	19.6%	11.6%	23.3%	12.7%	8.8% 100%

Answer "b" was "DOTI Instructor Crews only." 8.3% of respondents chose this answer. Answer "c" was "DOTI Instructor Crews, with Team Training Branch (TTB) personnel observing the training and assisting as necessary." 15.7% chose this answer. Answer "d" was "DOTI Instructor Crews, with Team Training Branch (TTB) personnel giving hands-on training to the capsule crews." 19.6% chose this answer. Answer "e" was "Team Training Branch personnel only.", and 11.6% of respondents chose this answer. Answer "f" was "Team Training Branch personnel, with DOTI Instructor Crews observing the training and assisting as necessary." 23.3% of respondents, the largest percentage, chose this answer. Answer "g" was "Team Training Branch Personnel, with DOTI Instructor Crews giving hands-on training to the capsule crews." 12.7% chose this answer. Answer "h" was "Other". 8.8% chose this answer. The most frequent comment was to the effect that TTB personnel should train DOTI MCCMs who

should in turn train the other MCCMs. One TTB NCO from Grand Forks wrote that this method was used at that base in connection with Project Teamwork, and that in his opinion it was successful, primarily because the DOTI MCCMs were "good students."

Question #62. Question #62 stated that "Capsule crews who were being evaluated on maintenance task performance should be evaluated by:". Answer "a" ("N/A, capsule crews should not perform maintenance.") was discussed previously in this chapter. The answers are explained below the table.

TABLE LVIII

QUESTION #62

Answers

	B	C	D	E	F	
all MCCM	48	28	28	25	27	
DOTI/DOV	15	12	9	2	6	
>36 months	16	9	5	9	11	
operations						
senior	21	6	5	2	5	
staff						
operations						
staff	30	17	8	3	4	
junior						
31XX	29	26	22	9	6	
senior						
Sr. 31XX	21	6	7	5	4	
9-Level	26	14	14	7	5	
3167X	41	30	27	21	12	
44570	6	19	18	14	4	
Totals	253	167	143	97	84	744
% total	34%	22.5%	19.2%	13%	11.3%	100%

Answer "b" was "Evaluator Crews (DOV) only." 34% of the respondents, the largest percentage, chose this answer. Answer "c" was "Evaluator Crews (DOV), with QC&E maintenance personnel observing the evaluation." 22.5% chose this answer. Answer "d" was "QC&E maintenance personnel, with DOV crew observing." 19.2% of the respondents chose this

answer. Answer "e" was "QC&E maintenance personnel only." 13% chose this answer. Answer "f" was "Other". 11.3% chose this answer. Most comments were to the effect that evaluations were not performed on maintenance personnel at every maintenance action, therefore they should not be performed on MCCMs.

Question #63, Enlisted Respondents. These respondents made the same types of comments made by other respondents. The breakdown was as follows:

9-level "in favor" comments:

Minor maintenance (drawer R&R) OK - 17 out of 27, or 63%.

Would save maintenance resources - 8 out of 27, or 29.6%.

Long overdue/implement immediately - 4 individuals.

Good idea but there will be implementation problems - 4 individuals.

Good idea but not all MCCMs have aptitude for maintenance - 3 individuals.

Good idea, train MCCMs in maintenance at Vandenberg or Chanute - 2 individuals.

Would help relieve maintenance workload, which is too great for us now - 2 individuals.

Would lessen LCC downtime - 1 individual.

Good idea but if maintenance personnel have to inspect MCCMs' LCC maintenance, then the maintenance team should just do it in the first place - 1 individual.

9-level "opposed" comments:

Would cause too much friction between maintenance and operations; for example jurisdictional disputes, "finger-pointing" - 2 out of 9, or 22.2%.

Not enough of a maintenance requirement to justify implementation - 2 out of 9, or 22.2%.

The remaining comments were each made by one individual:

- Would increase training burden on MCCMs.
- Would increase evaluation burden on MCCMs.
- SACHET would cut maintenance manning.
- Operations and maintenance should not be mixed on principle.
- MCCMs lack the aptitude to perform good maintenance.

3167X AFSCs "in favor" comments:

Minor maintenance (drawer R&R) OK - 30 out of 42, or 71.4%.

Would save maintenance resources - 12 out of 42, or 28.6%.

Long overdue/implement immediately - 4 out of 42, or 9.5%.

Good idea but some MCCMs might lack aptitude to perform good maintenance - 3 individuals.

Good idea but there would be implementation problems - 2 individuals.

Good idea but probably would not work due to implementation problems - 2 individuals.

Good idea, MCCMs should receive maintenance training at Vandenberg or Chanute - 2 individuals.

Would lessen LCC downtime - 2 individuals.

Would help relieve maintenance workload which is too much for us now - 2 individuals.

Would improve morale of both maintenance and operations personnel - 1 individual.

Would be good for MCCMs to know how to do maintenance in case of a wartime emergency - 1 individual.

3167X AFSCs "opposed" comments:

Operations and maintenance should not be mixed on principle - 2 out of 9, or 22.2%.

Not enough of a maintenance requirement to justify implementation - 2 out of 9, or 22.2%.

MCCMs lack aptitude to do good maintenance - 2 out of 9, or 22.2%.

If maintenance personnel have to go to an LCC to inspect MCCMs' maintenance, then a maintenance team should just do the task in the first place - 1 individual.

Lack of spare parts is more relevant than any lack of maintenance teams - 1 individual.

44570s "in favor" comments:

Minor maintenance (tighten screws, etc.) OK - 16 out of 16, or 100%.

Good idea but there would be problems during implementation - 5 out of 16, or 31.3%.

Would save maintenance resources - 3 out of 16, or 18.8%.

Would lessen LCC downtime - 3 out of 16, or 18.8%.

Would help to familiarize MCCMs with the weapon system - 2 individuals.

The following comments were each made by one individual:

- Good idea but probably would not work due to implementation problems.
- Good idea but would increase the workload on TTB and QC&E personnel.
- Long overdue/implement immediately.
- Good idea but some MCCMs might lack aptitude to do good maintenance.

44570s "opposed" comments:

MCCMs do not have time to perform maintenance while on alert in the LCC - 5 out of 10, or 50%.

Would increase the evaluation burden on MCCMs - 4 out of 10, or 40%.

Operations and maintenance should not be mixed on principle - 3 individuals.

MCCMs lack the aptitude to do good maintenance - 3 individuals.

Would increase the training burden on MCCMs - 1 individual.

It is beneath the dignity of an officer to perform maintenance - 1 individual.

MCCMs at Grand Forks AFB. MCCMs from Grand Forks AFB were broken out separately from other MCCMs to investigate whether or not their exposure to the Project Teamwork planning activities might have caused their "disapproval" percentages to differ significantly from the percentages of other MCCMs. The table is shown below. The tables for all MCCMs are shown earlier in this chapter, but the relevant percentages are discussed below.

TABLE LIX  
GRAND FORKS CREWS

Questions		Answers							
		A	B	C	D	E	Total	% D+E	
#17		9	12	4	10	23	58	56.9	
#22		12	6	5	10	25	58	60.3	
#35		9	9	6	9	25	57	58.2	
#36		7	13	3	9	25	57	59.7	
								% A+B	
#40		16	7	8	14	12	57	40.4	

		Other		Total		
		A	Answers	Responses	% A	
#60		34	23	57	59.7	
#61		31	26	57	54.4	
#62		29	27	56	51.8	

The Grand Forks percentage for Question #17 was 56.9%. This was 1.3% less than the all-MCCMs percentage of 58.2%. This was not a significant difference. The Grand Forks percentage for Question #22 was 60.3%, which was 4.3% greater than the all-MCCMs percentage of 56%. The Grand Forks percentage of 58.2% for Question #35 was 1.3% less than the all-MCCMs percentage of 59.5%. This was not a significant difference. For Question #36, the Grand Forks percentage of 59.7% exceeded the all-MCCMs percentage of 54.7% by 5%. For Question #40, there was no significant difference. The Grand Forks percentage was 40.4%, the all-MCCMs percentage was 38.9%, a 1.5% difference. For Question #60, the Grand Forks "answer 'a'" percentage was 59.7% compared to the all-MCCMs percentage of 51.9%. This was a 7.8% difference. For Question #61, the Grand Forks percentage was 54.4%, 5.9% greater than the all-MCCMs percentage of 48.5%. Lastly, for Question #62, the Grand Forks percentage was 51.8% against an all-MCCMs percentage of 50.2%. The 1.6% difference was not significant.

For four questions, #22, #36, #60, and #61, the Grand Forks percentage was greater by at least 4%; the maximum difference was 7.8% for Question #60. The number of respondents for the all-MCCMs percentage varied from 319 to 351 respondents, for an average of 331. The number of Grand Forks respondents varied from 57 to 58. The smaller number of Grand Forks respondents meant that each response counted for relatively more in terms of percentages. In conclusion, there is enough evidence from the data to suggest that MCCMs stationed at Grand Forks AFB may have been slightly more opposed to the concept than MCCMs stationed at a hypothetical "average" base. However, there was not enough data support to completely confirm that this was so.

Would the Proposal Save Maintenance Resources? Non-MCCM

Opinions.

TABLE LX

QUESTION #21

	A	B	C	D	E	Total	% D+E
operations							
senior	1	3	3	35	17	59	88.1
staff							
operations							
staff	5	7	13	44	35	104	76.0
junior							
31XX	3	9	8	55	42	117	82.9
senior							
31XX	3	2	3	17	20	45	82.2
9-Level	12	11	3	29	35	90	71.1
3167X	7	5	4	63	65	144	88.9
44570	7	12	13	28	22	82	61.0

Hypothesis 1E used Questions #21, #23, #29, #31, and #33 to determine if MCCMs believed the proposal could save maintenance resources. This section details non-MCCM responses to the questions.



TABLE LXI

## QUESTION #23

	A	B	C	D	E	Total	% D+E
operations							
senior	3	9	4	30	13	59	72.9
staff							
operations							
staff	3	16	9	39	36	103	72.8
junior							
31XX	7	19	4	48	39	117	74.4
senior							
31XX	3	8	3	14	17	45	68.9
9-Level	8	19	3	28	32	90	66.7
3167X	11	6	12	55	60	144	79.9
44570	10	10	10	30	22	82	63.4

Question #23 (Table LXI) stated "Capsule crews could help decrease LCC equipment downtime if they were authorized to remove and replace certain equipment drawers in the LCC." A majority of all groups agreed with the statement. The smallest percentage agreeing was 63.4% of 44570s.

Question #29 stated that "If maintenance personnel weren't always having to remove and replace drawers in the LCC, they could get to the more involved maintenance sooner." The table is shown below:

TABLE LXII

## QUESTION #29

	A	B	C	D	E	Total	% D+E
operations							
senior	2	22	14	16	5	59	35.6
staff							
operations							
staff	8	15	30	36	12	104	47.5
junior							
31XX	10	25	22	43	16	116	50.9
senior							
31XX	7	8	7	16	6	44	50.0
9-Level	9	19	11	37	13	89	56.2
3167X	11	19	33	53	25	141	55.3
44570	7	22	17	22	11	79	41.8

Missile maintenance officers, 9-level enlisted maintenance supervisors, and 3167X AFSCs all agreed with the statement by small majorities. For the other groups, the percentages agreeing were less than 50%. The smallest of these percentages was 35.6% of operations senior staff officers (1816 AFSC).

Question #31 stated that "If capsule crews performed some of the LCC maintenance, then maintenance personnel wouldn't have to make as many trips to the LCCs." The table is shown below.

TABLE LXIII

QUESTION #31

	A	B	C	D	E	Total	% D+E
operations							
senior	0	7	10	29	13	59	71.2
staff							
operations							
staff	5	13	9	49	26	104	72.1
junior							
31XX	8	14	14	53	27	116	69.0
senior							
31XX	2	5	4	21	12	44	75.0
9-Level	4	18	6	41	21	90	68.9
3167X	8	12	9	73	39	141	79.4
44570	8	14	6	40	11	79	64.6

Majorities of all groups agreed with the statement. The smallest percentage was 64.6% of 44570s.

Question #33 stated that "If capsule crews were maintenance qualified, maintenance resources could be allocated more effectively." The table is shown below. Majorities of all groups agreed with the statement. The smallest percentages were 50.6% of 44570s and 50.9% of operations senior staff (1816 AFSCs). These two groups probably had different reasons for answering as they did.

TABLE LXIV

## QUESTION #33

	A	B	C	D	E	Total	% D+E
operations							
senior	1	11	17	22	8	59	50.9
staff							
operations							
staff	6	16	19	43	17	101	59.4
junior							
31XX	5	20	21	41	29	116	60.3
senior							
31XX	5	6	6	16	11	44	61.4
9-Level	4	20	9	35	22	90	63.3
3167X	7	6	29	69	29	140	70.0
44570	6	15	18	30	10	79	50.6

In general, it could be stated that majorities all groups agreed with idea that implementation of the concept would save maintenance resources. Some of the majorities were quite substantial.

How MCCMs Spent Their Time on Alert - Questions #47-#58. As was previously mentioned, questions #47-#58 were directed at MCCMs. The purpose of these questions was to discover how alert time was spent. An excerpt from the questionnaire is shown below.

For questions 47 through 58, use this answer key:

- a) None, 0 hours.
- b) Less than 2 hours.
- c) 2 hours but less than 4 hours.
- d) 4 hours but less than 6 hours.
- e) 6 hours but less than 8 hours.
- f) 8 hours but less than 10 hours.
- g) 10 hours but less than 12 hours.
- h) 12 hours but less than 16 hours.
- i) 16 hours but less than 20 hours.
- j) 20 hours or more.

How many hours out of your last alert did you spend doing this activity?:

- 47. Training (i.e., self-study or training others).
- 48. Inspections and tests of LCC equipment.
- 49. Processing messages.
- 50. Testing and calibrating missiles and LF equipment.
- 51. Processing faults, both LF and LCC.
- 52. Processing trips on and off LFs, and monitoring their activity.
- 53. Educational activities such as MNEP, PME/SOS, etc.
- 54. Rest status.
- 55. Cleaning and housekeeping.
- 56. Updating LCC records, "a"-paging T.O.s, and related duties.
- 57. Free time (recreational reading, watching television, etc.  
Do not include time spent in rest status.)
- 58. Processing security situations.

The table of responses are shown below. The column for answer "j" was omitted because no respondents chose answer "j".

TABLE LXV

Hours Spent  
Answers to Questions #47-#58

	0	<2	2-4	4-6	6-8	8-10	10-12	12-16	16-20	
	A	B	C	D	E	F	G	H	I	
#47	17	148	130	25	10	1	1	1	0	
#48	3	243	79	8	3	0	0	0	0	
#49	0	172	110	30	13	5	2	0	1	
#50	55	150	72	23	14	11	4	5	0	
#51	19	219	74	14	4	2	1	1	0	
#52	17	121	78	50	27	21	12	2	4	
#53	111	82	85	40	11	2	2	0	0	
#54	2	2	8	86	193	38	5	1	0	
#55	20	268	36	8	0	3	0	0	0	
#56	55	230	40	8	0	0	0	0	0	
#57	38	127	89	50	19	4	2	3	0	
#58	32	274	33	8	4	0	1	1	0	
Total	369	2036	834	350	298	87	30	14	5	4023
%total	9.2	50.6	20.7	8.7	7.4	2.2	0.8	0.4	0.1	100

Visual inspection of the columns shows that almost 51% of the respondents spent less than two hours doing the types of things outlined in the questions. About 21% spent from 2 to 4 hours. The percentages then dropped off sharply, but about 90% of respondents spent 8 hours or less, and about 80% spent less than 4 hours. The phrase "of your last

alert" was chosen in order to get a cross-section of responses for the last alert. It was felt that asking MCCMs how much time they spent doing the items on an average alert would only introduce a risk of subjectivity. Some MCCMs may have been undergoing wing alerts, higher headquarters evaluations, or having a heavier than usual or a lighter than usual alert workload on that particular alert. Statistically, such things would "balance out" when all responses were considered together.

To better grasp the idea that some tasks took longer than others, regardless of column averages, the following table is presented:

TABLE LXVI

QUESTIONS #47-#58

Column with  
largest # 2nd largest  
value # value

#47		B		C	
#48		B		C	
#49		B		C	
#50		B		C	
#51		B		C	
#52		B		C	
#53		A		C	
#54		E		D	
#55		B		C	
#56		B		A	
#57		B		C	
#58		B		C	

All questions except #53 and #54 had their largest numerical value in column "B", which was "Less than 2 hours." Question #53, Educational Activities, had the highest value in column "A", which was "None, 0 hours." If typical, this data could bode ill for the future of such educational programs as the Minuteman Education Program (MMEP) and PME correspondence courses such as SOS. This data correlates with some

MCCMs' Question #63 comments, to the effect that the new C<sup>3</sup> or AFSATCOM equipment made studying in the LCC difficult or impossible because of the heavier EAM traffic associated with the new equipment. Several MCCMs used the questionnaire as a forum to complain about the frequency of the new message traffic and attempted to associate this with a decreased ability to perform maintenance tasks.

Question #54, "Rest status", attempted to discover how much sleep MCCMs got while on alert in the LCC. Column "E", or 6-8 hours, was the most popular response. Column "D", or 4-6 hours, was the second most popular response to this question.

Maintenance Historical Data from the Missile Wings, 1982-1983. With the assistance and cooperation of Headquarters Strategic Air Command Office of Maintenance Programs (HQ SAC/LBBA) and the Maintenance Analysis units at the six Minuteman wings, data that detailed drawer and component removal, replacement, and removal and replacement (R&R) actions for 1982-1983 was obtained for use in this research effort. Generally, each separate action, or task performed, counted as one unit for comparison purposes. An exception was that when separate removal and replacement actions were recorded at the same LCC on the same Julian date, the two actions were counted as only one unit for comparison. This was done for purposes of clarity and fairness, even though it was possible that sometimes there were indeed two distinct actions by different teams at different times. The table detailing the data is shown below.

TABLE LXVII

Average Annual LCC Drawer & Equipment Replacement Actions  
for 1982-1983

	SDRs	Keyboard Printer	All Drawers	All Radios	Base Totals
Ellsworth	45	N/A	41	0	86
Grnd Frks	200	61	96	28	385
Malstrom	37	28	87	109	261
Minot	13	27	31	41	112
FE Warren	38	35	76	0	149
Whiteman	34	11	69	0	114

Some data which otherwise would have been on the chart was omitted due to classification requirements.

The SDR (Signal Data Recorder) was a drawer-type device located in the LCC which provided a hard-copy printout on thermal paper. These printouts consisted of numerical codes which advised the MCCMs on duty of missile and LF equipment status and faults, LCC equipment status and faults, LF security alarms, and status and faults of other LCCs.

The Keyboard/Printer (K/P) was a console-mounted device similar in appearance to a typewriter or a microcomputer keyboard. It was used to manually input data from written orders or publications directly into the missiles' on-board computer. At the time of this research (1984) there were no Keyboard/Printers in Ellsworth AFB LCCs.

All LCCs at Grand Forks AFB and 25% of Malstrom AFB LCCs had a radio system found in no other LCCs. This radio was used for inter-computer communications only; it communicated between LCC, LF, and missile computers, and acted as a backup system to the cable communications that all LCCs at all bases had. These extra radio drawers accounted for a large part of radio system maintenance actions at Grand Forks AFB and, to a lesser extent, at Malstrom AFB.

The many and varied types of electronic equipment that are not radios are in the "All Drawers" category in the table above. A detailed description of all of these drawers and how they differ in configuration from one base to another, or even from one LCC to the next in the same squadron, would have been outside the scope of this research.

All of the equipment in the table above was equipment that was capable of being "R&R'ed", or removed and replaced, with a minimum of cable disconnections and reconnections, and without the use of specialized test equipment to the best knowledge of the researcher and maintenance analysis personnel.

The list of bases, when ranked in order of largest average amount of maintenance actions taken, was as follows:

321 SMW, Grand Forks AFB	- 385 actions total
341 SMW, Malmstrom AFB	- 261 actions total
90 SMW, FE Warren AFB	- 149 actions total
351 SMW, Whiteman AFB	- 114 actions total
91 SMW, Minot AFB	- 112 actions total
44 SMW, Ellsworth AFB	- 86 actions total

Malmstrom AFB and FE Warren AFB each had four Strategic Missile Squadrons assigned instead of the three squadrons found at the other Minuteman bases. Therefore those two bases should have theoretically had a history of more maintenance actions than the other bases. Ellsworth AFB LCCs, with their relatively primitive equipment, had less items of equipment that MCCMs could remove and replace.

Naturally, the bases (Strategic Missile Wings) with the largest number of maintenance actions taken would seem to have had the biggest incentive to approve of the concept. These bases also had the greatest need for maintenance extenders.



#### IV. Data Analysis and Discussion

Hypothesis 1. The main hypothesis was that an approximate range of between 51% and 67% of MCCMs would disapprove of the concept of MCCMs performing LCC maintenance. This hypothesis was supported by survey data. With the exception of Question #40, the actual percentages varied from 48.5% to 59.5%. This range was towards the lower end of the hypothesized range. This meant that the number of MCCMs who rejected the concept was slightly smaller than predicted.

Sub-hypothesis 1A was partially supported by survey data. MCCMs with three or more years on crew rejected the concept by a smaller percentage than did other MCCMs. However, for three of the eight criterion questions less than 50% of MCCMs with over three years on crew rejected the concept. This meant that the number of experienced MCCMs rejecting the concept was slightly smaller than predicted.

Sub-hypothesis 1B was not supported by survey data. The small percentage difference between MCCCs and DMCCCs lent support to the idea that crew position (MCCC vs DMCCC) was of little importance vis-a-vis attitude toward the concept. These results were compared with the results of sub-hypothesis 1A in light of the fact that nearly all of the MCCMs with three or more years on crew were MCCCs. The conclusion arrived at was that crew position (MCCC vs DMCCC) had no significant impact on tendency to approve of or disapprove of the idea. The length of time spent as a MCCM seemed to have significant bearing on tendency to approve of or disapprove of the concept.

Sub-hypothesis 1C was that the most common reasons that would be

given by MCCMs for accepting or rejecting the concept would be the reasons listed during the discussion of this sub-hypothesis in Chapter III. A significant number of comments referring to a predicted reason would indicate a need to confront the issue raised by that reason. A thorough discussion of each of the predicted reasons would indicate a need to confront the issue raised by that reason. A discussion of each of the predicted reasons and the survey results for each of them can be found in Chapter III.

Technically the results for this sub-hypothesis were mixed. Six predicted reasons were given by significant measurable percentages of MCCMs and seven other reasons were given by less than 4% of the respondents. Three other reasons were given by between 7% and 9% of respondents. Therefore, some of the predicted reasons were not actual issues. No reasons not on the predicted list were given by more than one respondent. Analysis of reasons given by 7% or more of respondents yielded the following information of interest: on the issue of MCCMs' ability to perform maintenance, MCCMs seemed to divide into two distinct groups. The larger group was made of about 45% to 63% of MCCM respondents. The smaller group made up 28% to 40%. The percentages varied with the question. The larger group believed that MCCs had the ability to perform maintenance tasks. The smaller group believed that MCCMs lacked the ability to perform maintenance.

Opposition to the inclusion of maintenance actions in DOV or higher headquarters Standardization Evaluations was widespread in Question #63 comments. A majority of MCCMs who stated in Question #63 responses that they were opposed to the concept mentioned this concern. This fear of

being evaluated on maintenance tasks may have been the single greatest reservation that MCCMs had about performing maintenance. It would appear that the majority of MCCMs perceive DOV evaluations as a threat to be avoided. Any implementation of the concept would have to deal with this issue by striking a balance between the need to insure that an acceptable level of maintenance was being performed and the need to avoid damaging MCCM morale or lowering MCCMs' perceptions of their job.

A group of MCCMs composing about 22% of Question #63 "opposed" respondents felt that increased training would result from implementation of the concept. This group feared that their time off would be reduced by extra training. At the time this research was conducted (1983-1984), MCCMs were already scheduled for one day per month for weapons system training which was conducted by DOTI Instructor MCCMs. Training in drawer removal and replacement procedures was given annually on these scheduled training days. If the concept were to be implemented, training in drawer removal and replacement could be given more frequently on scheduled training days. DOTI Instructor MCCMs might have to adjust their cycle of recurring training subjects to "fit in" the additional training. If there were no increase in training days due to the implementation of the concept, one more potential "people problem" would be avoided.

Slightly more than 67% of all MCCM respondents were concerned that implementation might be a "foot in the door" for an increasing number of maintenance tasks assigned to the MCC. Also involved in this concern was the idea that MCCMs might lose their professional identity as operations personnel and become maintenance personnel.

Different groups of MCCMs had these concerns to different degrees. More MCCCs than DMCCCs had these concerns. More MCCMs with three or more years on crew had these concerns than did MCCMs with less than three years on crew. Only 60% of Grand Forks MCCMs had this concern. MCCMs assigned to DOTI and DOV, and MCCMs with previous maintenance experience, did not have these concerns to any greater degree than other MCCMs.

For whatever reason, the fact that the majority of the most experienced MCCMs expressed this apprehension demonstrated the extent of the preconceptions that existed among MCCMs about the concept. The smaller percentages among less-experienced MCCMs offered a degree of hope in that these MCCMs did not share to the same degree the belief that they would eventually come to be considered as maintenance personnel.

A bare minority (49%) of MCCMs believed that they would not have the time to perform maintenance tasks while on alert in the LCC. In practical terms, this means that a majority of MCCMs thought they had the time on alert to perform maintenance actions in the LCC. If removal and replacement maintenance were to be performed at crew changeover time, the presence of four individuals in the LCC might help to speed the R&R process. It was possible that at least some of the 100 respondents to Question #63 were actually complaining about the AFSATCOM equipment and not about lack of time per se.

There was concern among all MCCMs being trained in maintenance task performance might degrade their proficiency in their primary duties. About 51% of MCCM seemed to have this concern. There appeared to be a

correlation between time spent on crew and a tendency to disagree with the idea that MCCMs would have no time to perform LCC maintenance, or that being trained in maintenance would degrade performance in primary duties. The fact that more MCCCs than DMCCCs agreed with the statements of the questions demonstrates that the same correlation does not exist for crew position.

A majority of MCCMs (about 59%) agreed with statements that they should not do maintenance because they were operations personnel. A small number of MCCMs also mentioned this in their Question #63 comments. These survey results could have been described as lending support to the idea that parochialism, or what Allgaier called "artificial distinctions" (1:74), would be perhaps the greatest "people problem" obstacle to implementation of the concept. MCCMs were almost all junior officers (Captain or below). Most were on their first duty assignment with no Air Force experience outside of missile operations. Ignorance of the responsibilities and the working environment of maintenance personnel could be a contributing factor to a parochial attitude. The attitudes of operations staff and senior staff officers did not differ much from MCCM attitudes towards this subject (actual percentages were investigated in Hypothesis 3). There was also some possible evidence of what may have been a parochial attitude among some maintenance personnel. These seemed to resemble the opinions noted by Chenzoff, et al. (2:11-1 & 11-2), and were investigated in later hypotheses.

A small group of MCCMs felt their morale would be damaged if they were tasked to perform LCC maintenance. Some of the comments suggested

that the writers felt overwhelmed by their present duties. The tone of some of the comments suggested some respondents may have already had morale problems, not necessarily related to the concept of performing LCC maintenance. These comments seemed to demonstrate that a majority of MCCMs would tend to disagree with the recommendations of Christie (3:29-32) and Kuenning and Mattson (6:128) that MCCMs' talents would be better utilized if they were to assume limited maintenance responsibilities.

Another small group of MCCM respondents suggested that a third crew member should be added to MCCs. This third crew member would be responsible for communications and especially for operating the new C<sup>3</sup> AFSATCOM equipment. This could be evidence that at least some MCCMs were having difficulty in learning to cope with the new C<sup>3</sup> AFSATCOM equipment. If true, this could have been due to a learning curve phenomenon. Investigation of this conjecture was outside the scope of this research.

Several of the predicted reasons were not actually given in any measurable percentages. The predicted reasons and the actual percentages of MCCMs who gave those reasons were discussed in Chapter III.

Sub-hypothesis 1D results were that DOTI and DOV MCCMs disapproved of the concept by a slightly higher percentage than did other MCCMs. This difference was barely significant. These results lent further support to the idea that crew position (or agency of assignment) had no significant effect on MCCMs' attitudes for or against the concept.

Sub-hypothesis 1E results were that MCCMs who approved the concept did so for a number of predicted reasons. These reasons were listed in

Chapter III. As with sub-hypothesis 1C, the results were mixed. Three reasons were quoted by a significant number of MCCM respondents. Four reasons were not. Two other reasons were given by small percentages of MCCMs. One reason not predicted was given by a respondent. The reasons are enumerated below.

MCCMs who approved of the concept usually assumed that removal and replacement of drawers, tightening screws and handles, etc. would be the extent of contemplated maintenance tasks. A large majority (61.6%) of Question #63 "in favor" respondents made this sort of comment.

Overall, a majority of all MCCMs believed that implementation of the proposal would save maintenance resources: principally fuel and maintenance manhours. The actual percentages for question can be found in chapter III.

A large number of MCCM respondents believed that "people problems" associated with implementation would inhibit the practicality of the proposal. Specific problems mentioned included but were not limited to fear of performing maintenance, fear that conflicting channels of authority would burden MCCMs on alert, fear of gradually being turned into maintenance personnel, and fear of more evaluations. MCCMs seemed to be aware of the existence of "people problems" that would have to be dealt with during any implementation attempts.

A small number of respondents felt that if the concept were to be implemented MCCMs should be trained at Chanute AFB or Vandenberg AFB. Chanute AFB trained Minuteman missile maintenance personnel while Vandenberg AFB trained prospective MCCMs. This MCCM training was called Initial Qualification Training (IQT). Most respondents felt that drawer

removal and replacement techniques should be incorporated into IQT at Vandenberg AFB. Some respondents felt that Chanute AFB maintenance technician instructors could more easily train MCCMs in maintenance tasks.

Another small group believed that if MCCMs performed LCC maintenance, they should do so with the active cooperation of Job Control. Maintenance teams in the missile field constantly kept in contact with Job Control and/or their home shops while performing maintenance tasks. If the concept were to be implemented MCCMs should be in contact with Job Control and/or the applicable shop as a matter of course.

One respondent to Question #63 believed that if MCCMs performed maintenance then missile maintenance officers should attend IQT and be required to "pull alerts." This respondent may not have been entirely serious. However, the idea was noted.

Several of the predicted reasons were not actually given in any measurable percentages. The predicted reasons and the actual percentages of MCCMs who gave those reasons were listed in Chapter III.

Sub-hypothesis 1F results were that approximately 83% of MCCMs agreed with question #44 and 84% agreed with question #45. The very large percentages agreeing with Questions #44 and #45 showed that many MCCMs who were not in favor of the concept might be persuaded to support the concept if management laid down guidelines, such as those referred to in these two questions, and then stuck by them. There was a large body of opinion among MCCMs that desired strong guarantees their position as MCCMs would not be somehow made "shaky" by the



implementation of the concept and that they would not be subject to new and poorly defined chains of command. The small number of MCCMs (40%) who agreed with the statement of Question #46 showed that MCCMs were divided on this issue. Possibly the division was along the lines of the group that was apprehensive about performing maintenance vs the group that was not apprehensive. The issue of having control of what goes on in the LCC had been a sensitive one among MCCMs for years, possibly for as long as there had been ICBMs. Paolucci commented on this sensitivity in 1977 (7:15-18, 36).

Hypothesis 2. The hypothesis was that MCCMs with Titan II operations experience or with ICBM maintenance experience would not oppose the concept to the same degree as did other MCCMs. Survey results supported this hypothesis. What this would mean in practical terms for any attempt to implement the proposal was that once MCCMs were exposed to maintenance, it would be likely that most of them would come to accept the idea. This assumed the caveats given by MCCMs earlier in this chapter would be considered by those responsible for any implementation attempt.

Hypothesis 3. The hypothesis was that a majority of operations staff and senior staff officers would approve of the concept. This hypothesis could not be supported. In practical terms, this meant that there was a less than expected degree of support for the concept among these officers. The data also showed that opposition to the concept was less among these officers than among MCCMs. There was also found to be a constant close agreement between the attitudes of operations staff and senior staff officers.

Sub-hypothesis 3A results were that operations staff and senior staff officers tended to agree or disagree with specific questions by similar percentages.

Sub-hypothesis 3B results were that the sub-hypothesis could neither be proven nor disproven since too few of these officers had maintenance experience to make up an acceptable sample size. The very fact that so few operations senior staff officers had any maintenance experience could have been a possible symptom of an underlying problem. Demographic data showed that 56% of missile maintenance officers had ICBM operations experience. The same data also showed that only 5.8% of all operations officers had ICBM maintenance experience. This nearly tenfold difference illustrated a possible dichotomy. If 56% of operations senior staff had had ICBM maintenance experience, would that group have approved of the concept by a considerably larger percentage? Unfortunately, without a large enough sample population this idea must remain conjectural. If more senior staff officers had had operation experience, would they have a more favorable attitude towards the concept of MCCMs performing LCC maintenance? Would this more favorable attitude have influenced more MCCMs to approve of the concept? Unfortunately this is also conjecture.

Sub-hypothesis 3C results were that, once again, the attitudes of operations staff officers tended to parallel the attitudes of operations senior staff officers, not the attitudes of MCCMs.

Sub-hypothesis 3D results seemed to support the idea that exposure to maintenance tended to increase the tendency of operations staff

officers to favor the proposal. This finding paralleled similar findings for MCCMs. Therefore, it would appear there may have been a general tendency on the part of individuals to be less "afraid" of maintenance once they had been exposed to it.

Sub-hypothesis 3E results revealed that operations staff and senior staff officers generally had similar thoughts and concerns about the concept of MCCMs performing LCC maintenance. Senior staff officers who favored the concept had various reasons for doing so. The percentage of officers who mentioned each reason were listed in Chapter III. A majority of these officers felt drawer removal and replacement by MCCMs was a good idea. Smaller numbers believed:

- (1) DOV evaluations of MCCM's maintenance would be counterproductive.
- (2) Implementation of the concept would save maintenance resources.
- (3) MCCMs were overworked.
- (4) The concept would help familiarize MCCMs with the weapon system.
- (5) The concept should be implemented immediately.
- (6) Other comments were made by one individual each. These were detailed in Chapter III.

Operations senior staff officers who were opposed to the concept also gave their reasons in Question #63. Half of these officers were concerned that MCCMs would not have time to perform LCC maintenance.

Smaller groups believed:

- (1) Implementation would place a heavier training and/or evaluation burden on crews.
- (2) Implementation would degrade MCCM's performance in their primary duties.

Operations staff officers who approved or disapproved of the concept gave reasons that in general paralleled those of senior staff

officers and of MCCMs. Among the reasons given for approval were:

- (1) Minor maintenance such as drawer R&R would be a good idea.
- (2) The concept should be implemented immediately.
- (3) Implementation would conserve maintenance resources.
- (4) MCCMs should be trained in maintenance during IQT.
- (5) There should be no evaluation of MCCM maintenance.
- (6) "People problems" would arise during implementation.

Operations staff officers who were opposed to the concept gave the same reasons as other groups who were opposed. A majority (59%) believed MCCMs had no time to do maintenance on alert. Smaller numbers believed:

- (1) Implementation would place a heavier training and/or evaluation burden on MCCMs.
- (2) Implementation would degrade MCCMs' proficiency in their primary duties.
- (3) Maintenance was beneath an officer's dignity.
- (4) Operators should not perform maintenance tasks on principle.
- (5) Since aircrews did not perform maintenance tasks, neither should MCCMs.
- (6) Implementation would lower morale.
- (7) Not enough drawer removal and replacement went on to justify implementation.

The question #63 comments of all groups of respondents were analyzed. These groups were the MCCMs operations staff officers, operations senior staff officers, missile maintenance officers, "9-level" senior enlisted maintenance supervisors, and enlisted maintenance supervisors in AFSCs 3167X and 44570.

Two patterns emerged from the analysis. First, in each group studied, the "in favor" respondents were always the larger percentage.

The extreme example was the 3167X group, where 82% of Question #63 respondents favored the concept.

The second pattern was that each group generally gave the same reasons for approving or disapproving of the concept. For example, the missile maintenance officers and enlisted personnel gave the same reasons for approval or disapproval as the MCCMs and other operations officer groups already discussed. There were minor differences which may have been associated with parochial outlooks. For example, maintenance personnel were somewhat more concerned with the quality of maintenance and somewhat less concerned with a possible increase in the MCCM training burden.

These intergroup similarities showed that all respondents had common concerns about the concept of MCCMs performing LCC maintenance. These shared concerns could be a powerful aid to any implementation effort because professionals with common concerns would hopefully work together to overcome common problems. For example, one senior NCO voiced a decidedly non-parochial outlook when he suggested that the DO and DCM should work together to decide what tasks MCCMs could perform. Another example was an operations staff officer who wanted maintenance officers and operations officers to share a common AFSC and to spend time in both operations and maintenance jobs.

Hypothesis 4. This hypothesis and the sub-hypotheses associated with it investigated missile maintenance officer attitudes. The main hypothesis was that a majority of missile maintenance officers would favor implementation. This hypothesis was supported from survey data; missile maintenance officers favored the concept by from 57% to

84%, depending on the question. Sub-hypothesis 4A demonstrated that missile maintenance officers with ICBM operations experience favored implementation by slightly higher percentages.

Survey results measured against sub-hypothesis 4B demonstrated that Lieutenants and Captains shared the attitudes of field grade officers by similar percentages. This meant that time spent in the missile maintenance career field appeared to have little effect on attitudes. Rather, a large majority of all missile maintenance officers tended to favor the concept. Question #63 comments from missile maintenance officers supported this idea since 83% of the comments were in favor of implementation. This group's comments tended to focus mainly upon the anticipated benefits to maintenance agencies, such as anticipated savings in fuel and man-hours. The biggest concern of the "opposed" group was that there might not be enough of a requirement for drawer removal and replacement to justify implementation. Other comments mirrored the concerns of missile operations officers though in lower percentages. It could be suggested that this difference was due to a greater breadth of experience among those officers who had operations experience.

Hypothesis 5. This hypothesis and its associated sub-hypotheses measured the attitudes of enlisted respondents toward the concept. The main hypothesis was that a majority of these personnel would favor implementation. This was supported by survey data; approval percentages varied from 54% to 86% depending on the question. Sub-hypothesis 5A found strong support for implementation among 3167X AFSC 7-level supervisors. This was the group directly responsible for

removal and replacement of LCC equipment drawers and for the repair of those drawers at the base. One of these individuals believed technicians would be able to repair drawers at a faster rate if they did not have to spend time driving out in the missile field to get the drawers. From 65% to 93% of this group favored implementation of the concept, depending on the question.

Sub-hypothesis 5B found greater than predicted support for implementation among 44570 AFSC 7-level supervisors. This group was responsible for heavy repairs in the LCC. The prediction was that this group would be relatively indifferent towards implementation since the concept did not call for MCCMs to perform heavy, involved LCC maintenance. It could be that some 44570 AFSC respondents perceived implementation as being of some minor benefit to their career field. For example, MCCMs could be authorized to tighten or replace loose or missing screws on LCC equipment, floor plates, etc. Normally, 44570 AFSC personnel performed this type of LCC maintenance as part of the biannual preventive maintenance inspections (PMIs).

Sub-hypothesis 5C measured the attitudes of 9-level senior enlisted supervisors. Survey data demonstrated these individuals favored implementation to a greater degree than the 44570 AFSC supervisors but not as much as 3167X AFSC supervisors. The 9-level attitude appeared to be an averaging out of the attitudes of the other two enlisted groups. Many of the senior supervisors had held either 3167X or 44570 AFSCs in the past. Therefore, a possible explanation for the percentage results of this group could be that past job experience (former AFSC) and the nature of the individual's present work counted for more than present

AFSC. If this were true, then there was no "9-level attitude" as such. Rather, these individuals held the viewpoints of the groups from which they had come.

To sum up enlisted attitudes, it appeared that personnel holding 316XX AFSCs, both 7- and 9-level, favored the concept to a large degree because they perceived implementation as being of great possible benefit to them in their work. Personnel holding 44570 AFSCs, both 7- and 9-levels, favored the idea only slightly, possibly because they perceived implementation as having only a slight benefit to them in their work.

Though not part of a hypothesis, the Question #63 comments of enlisted respondents were tracked. The favorable comments of all three enlisted groups paralleled the comments of missile maintenance officers. This meant that both commissioned and enlisted missile maintenance personnel anticipated similar benefits from implementation. These mainly were focused on saving maintenance fuel and man-hours and to a lesser extent on minimizing LCC downtime. Enlisted "opposed" comments varied in frequency from group to group. Nine levels feared friction between operations and maintenance agencies; especially if something "went wrong" during the removal and replacement of a drawer. These 9-level respondents were concerned about the assignment of blame and "finger-pointing" as a source of friction. The only other frequent comment made by this group was that there might not be enough of a requirement for drawer removal and replacement actions to justify implementation. This comment was also made with some frequency by the small group of opposed 3167X AFSCs (9 individuals), but not by opposed 44570 AFSCs (10 individuals). Both 3167X AFSCs and 44570 AFSCs who were



opposed were concerned that MCCMs would lack the ability to perform maintenance tasks. Some respondents pointed out that MCCMs were not selected for maintenance aptitude and were not trained in troubleshooting techniques. All of these comments appeared to address valid issues which would have to be faced during any implementation attempt.

Hypothesis 6. This hypothesis was designed to measure the prevalence of one specific viewpoint among all respondents. The viewpoint measured was a belief that MCCMs could perform the same level of "quality maintenance" on a drawer removal and replacement as a regular maintenance team could. Although the hypothesis itself was not supported, there was strong evidence for a widespread belief that MCCMs could perform "quality maintenance." The 44570 AFSCs were, as a group, uncertain about the quality of MCCM-performed maintenance and a majority of MCCMs were opposed to implementation of the concept. Other groups had more confidence in MCCM's ability to do maintenance. This support and confidence reached the highest percentage when respondents believed that MCCMs would be trained in maintenance, would be authorized to do maintenance, and that MCCM maintenance would be inspected by qualified maintenance inspectors.

Personnel Concerns. Operations personnel were more concerned about the over-burdening of training and evaluation agencies during implementation than were maintenance personnel. This may have been because all groups of respondents perceived DOTI and DOV as doing the bulk of any necessary training and evaluations. This seemed to be a valid concern. Any implementation attempt would have to be carefully

planned to avoid any possible overloading of wing training and evaluation functions.

Did MCCMs Have Time to do Maintenance? The attitudes of all respondents were also measured concerning the idea that MCCMs would not have the time to perform LCC maintenance. Very few maintenance personnel agreed with this idea, whether they were commissioned or enlisted. More operations personnel than maintenance personnel agreed with the statement, but MCCMs assigned to DOTI or DOV were the only group in which a majority agreed with the idea. There was some possible evidence of parochialism. MCCMs who opposed the concept often commented in Question #63 responses that people who had not "pulled alerts" recently had no conception of the size of the present MCCM workload. Some of the operations staff and senior staff respondents also believed that the alert workload had increased in recent years. At the other end of the spectrum, a few missile maintenance personnel commented that it was well known that MCCMs did little or nothing while on alert in the LCC. Since individuals who felt this way would be involved in implementation attempts, it could be suggested that some type of educational effort designed to show operations and maintenance personnel "how the other half lives" might be included as part of the implementation process. For example, MCCMs might be required to accompany a maintenance team out to the missile field on a periodic basis. Maintenance personnel might be required to sit in on an unclassified MCCM training day.

Attitudes Concerning Training, Inspection, and Evaluation.

The attitudes, ideas, and suggestions of respondents concerning the training, inspection, and evaluation of MCCM-performed LCC maintenance

were tracked. Concerning training, a large majority (81%) of MCCMs thought that they should be given hands-on training similar to that received by maintenance technicians (Question #43). A large majority of all survey respondents (80%) felt that all MCCMs should be trained in all maintenance tasks that would be assigned to MCCMs. A small number believed that only selected MCCMs should be trained in maintenance.

Concerning the issue of who should train MCCMs in maintenance, opinions were widely distributed. The most popular choices involved various combinations of DOTI and TTB personnel. Comments demonstrated that one suggested method of giving DOTI the primary responsibility would be to have TTB instructors train the DOTI MCCMs. The DOTI MCCMs would then train other MCCMs. This was the most popular specific suggestion given for setting up a training program. Several respondents, from all groups, saw no reason to give MCCMs extra maintenance training. These respondents felt that since MCCMs were already trained in the removal andson to give MCCMs extra maintenance training. These respondents felt that since MCCMs were already trained in the removal and replacement of certain LCC equipment drawers, all that would be necessary would be to provide the MCCMs with tools and technical data. At the other end of the spectrum two missile maintenance officers, both former MCCMs, commented that they had had bad experiences at Job Control while directing MCCMs in drawer removal and replacement. One of these officers was the author of an ACSC report reviewed in Chapter I. He complained that his technicians had spent several hours instructing a MCC over the phone in how to remove and replace a drawer. The crew in question had received annual DOTI training in the removal and

replacement of that very drawer. The officer commented that such incidents could serve to convince a person that maintenance by MCCMs could be more trouble than it was worth.

The issue of who should inspect MCCM maintenance was one that drew many varied responses. The most popular answer was that no inspection was required if the equipment worked properly after installation. Respondents stated that maintenance performed by MCCMs should not be inspected any differently or with any more frequency than maintenance performed by maintenance teams. One group of respondents (29%) wanted MCCM maintenance to be inspected by qualified maintenance personnel or by QC&E personnel. The only other answer given with any frequency (8%) was that the relieving MCC and/or the Flight Commander should inspect the maintenance. These responses revealed the existence of a large body of opinion to the effect that all maintenance should be treated similarly regardless of who had performed the maintenance. This policy would cause the minimum amount of disturbance and increased workload for the established maintenance inspection agency, QC&E, during any implementation of the concept. MCCMs were already required to inspect all LCC equipment when they began an alert. Therefore, the inspection of a newly installed drawer would not increase the regular MCCM workload.

The question of who should evaluate MCCMs performing maintenance tasks was controversial, especially among MCCMs. The opposition of most MCCMs to the idea of more evaluations has already been noted. About 1/2 of respondents answered that MCCMs should be evaluated by DOV evaluators with or without QC&E personnel present. About 33% believed that QC&E should evaluate, with or without DOV personnel present. A small group

saw no reason for any evaluation and thought that increased evaluations would add unnecessary work to the implementation process as well as alienating MCCMs.

The evaluation issue will have to be dealt with during any implementation attempt. Questions to be answered include the followings: "Should MCCMs be evaluated or maintenance tasks?" "If so, then who should do the evaluation?" "If QC&E enlisted personnel evaluated commissioned MCCMs, who would resolve conflicts?" "Would these maintenance evaluations have the same weight as regular DOV Standardization Evaluations, with the same perceived damage to careers that could result from a failed evaluation?"

Grand Forks Responses. Survey data provided no hard evidence to support the idea that MCCMs assigned to the 321 SHW at Grand Forks AFB were either "for" or "against" the concept to any greater degree than other MCCMs. These findings should discount any idea that Grand Forks MCCMs' exposure to the early Project Teamwork planning would prejudice them either for or against implementation. Thus, the presence of these individuals in the survey sample should not skew the data in one direction or the other.

Would Implementation Save Resources? Non-MCCM Responses. The opinions of non-MCCM respondents were solicited concerning the idea that implementation would save maintenance resources. The specific questions and percentages agreeing with them were detailed in Chapter III. The findings were that majorities of all non-MCCM groups believed that implementation of the concept could save maintenance resources.

Questions #47-#58. The data from Questions #47-#58 revealed

how MCCMs spent their time on alert. This data could be of interest to future research as well as being relevant to this research. Several questions in this series were particularly relevant to the concept of MCCMs performing LCC maintenance. One such question was #57, which was designed to discover how much free time MCCMs had on a typical alert. Survey results showed that only 12% of MCCMs had no free time on their last alert. Fifty percent had at least two hours of free time. Results for question #49 showed that 85% of MCCMs spent four hours or less processing messages, including C<sup>3</sup> AFSATCOM traffic. However, this traffic was usually distributed fairly evenly over the 24 hour alert. These results show two things: (1) there was some free time available during which MCCMs could have performed minor maintenance if they had had to, and (2) while message traffic was undoubtedly annoying to MCCMs and may have been a heavy burden on some alerts, such traffic does not usually "fill up" an alert. In recognition of the many MCCMs who wrote that they felt over-burdened by message traffic, research should be done in this area. Such research could settle the issue of whether or not message traffic was excessive.

Maintenance Historical Data. The analysis of this data showed wide differences in the average yearly number of MCCM-performable maintenance actions from base to base. The 321 SMW at Grand Forks AFB had by far the largest average yearly number of maintenance actions, 385. The next largest average number was at the 341 SMW at Malmstrom AFB, 261. Since the 341 SMW had four SMS squadrons, it had 20 LCCs compared to the 15 LCCs at the 321 SMW. This makes the 321 SMW's number of maintenance actions performed all the more impressive.

Based upon this data, the 321 SMW had the greatest incentive to implement a program of MCCMs performing LCC removal and replacement actions. The 44SMW at Ellsworth AFB had the least incentive. The 44 SMW had the same number of LCCs, 15, as the 321 SMW; yet the 321 SMW had nearly 450% more maintenance actions (385 to 86). Most of this difference was probably due to the fact that 321 SMW LCCs had the greatest relative number of components that could be repaired by the removal and replacement of drawers. The 44 SMW LCCs had the smallest relative number of these components. What this meant in practical terms was that equipment configuration differences between LCCs at different wings resulted in a varying need for MCCMs to serve as maintenance extenders. This meant that any force-wide implementation of this concept would have varying efficacy and relevance. While the 321 and 341 SMWs might derive great benefit from such implementation, the same implementation at the 44SMW might be relatively less beneficial.

## V. Conclusions and Recommendations

### Conclusions

1. There is a real need to implement the concept of MCCMs performing LCC maintenance. The degree of this need, which varied at different Minuteman wings, was discussed in the last section of Chapter IV.

2. There were two bodies of opinion among MCCMs concerning the idea. The majority group, from 50-60% in size, was opposed to the idea of MCCMs performing LCC maintenance for a variety of reasons. The minority group was in favor of the idea for a variety of reasons. There was evidence that as MCCMs accumulated more time on crew, they would have a greater tendency to favor the idea. The main reasons for MCCM opposition to the concept were:

- Concern about being evaluated by DOV or by higher headquarters on maintenance tasks.
- Concern that MCCMs would be tasked with an ever-increasing number of maintenance duties and would therefore lose their professional identity as operations personnel. MCCMs often had a great deal of pride in their profession and some felt threatened by this proposal. Associated with this fear was the belief that operations and maintenance duties should not be mixed.
- Concern that if the concept were implemented then MCCMs would be overloaded with increased training requirements, an increased number of tasks to be accomplished on alert, an increase in time spent on alert, and liability for any damaged equipment.
- Concern that if the concept were implemented then MCCMs would work for two masters - the DO and the maintenance agencies.

3. Operations staff (1835 AFSC) and operations senior staff (1816 AFSC) personnel were less opposed to the concept than were MCCMs. The same two bodies of opinion, in roughly similar proportions, were found



among this group of officers. They also had roughly the same concerns about and suggestions for implementation.

4. Maintenance personnel, both officer and enlisted, generally supported the concept of MCCMs performing LCC maintenance. The primary reason for this support was the widespread belief that implementation would be of direct, tangible benefit to maintenance personnel. The principal perceived benefit was that implementation of the concept would save maintenance resources, both manpower and fuel.

5. Almost none of the respondents were concerned about the safety ramifications of implementation to any great degree, with the exception of personnel assigned to the Wing Safety Office. Even these respondents saw no great problem with safety, as long as MCCMs were properly trained in the maintenance procedures. Safety considerations would have to be a factor during any implementation effort.

6. Concerning past literature on this and related subjects:

- The observations made by Allgaier (1) concerning MCCMs' sensitivities about controlling their LCCs while on alert were still relevant; MCCMs had the same concern about this issue in 1984 that MCCMs had had at the time of Allgaier's study in 1979.
- The observations made by Chenzoff, et al. (2) in 1983, especially those concerning perceptions by Minuteman maintenance personnel that they were undermanned and overworked, were reflected in the survey responses. This was at least partly responsible for the widespread approval of the concept by maintenance personnel.
- Observations made in other studies were not as relevant. Most MCCMs rejected the recommendations of Christie (3), Kuenning and Mattson (6) and Paolucci (7) that MCCMs would be more fulfilled in their jobs if they were given added duties and responsibilities.

7. Implementation would save maintenance resources. How much of what kind of resources would be saved would vary from wing to wing, year to year, and would often vary (on a daily basis) with the distance from

the base to a particular LCC. Implementation would also help to break down the walls of parochialism that seemed to divide maintenance and operations functions (at least at the lower levels) in Minuteman wings.

8. Most operations and maintenance personnel felt that MCCMs could be trained to perform maintenance and were capable of performing maintenance. Even MCCMs who were opposed to implementation of the concept generally shared this belief.

9. Many respondents to the survey, both MCCMs and non-MCCMs, made the same specific comments for and against implementation. These comments represented legitimate bodies of opinion that should be recognized. The personnel at the Minuteman wings were the closest to the action and therefore should be listened to, whether or not their suggestions were actually to be adopted.

#### Recommendations

The primary recommendation is that since the concept has merit it should be implemented. The recommendations below were focused upon the basic issues that would be involved in any implementation.

Training. MCCMs could receive initial drawer removal and replacement training during Initial Qualification Training at Vandenberg AFB. Recurring periodic training for MCCMs at the Minuteman wings could be accomplished by increasing the frequency of existing drawer removal and replacement training. DQTI personnel would have to adapt their cycle of existing weapon system training topics to make the necessary room for more frequent drawer removal and replacement training. Initially, this training should be given on a quarterly basis. If experience at a wing were to prove the training should be given more or less frequently than

once per quarter then that wing's DOTI would be able to adapt their training schedule accordingly.

The DOTI Instructor MCCMs would receive initial training from TTB Instructors. DOTI Instructors could then train all other MCCMs. If DOV Evaluators were to be tasked with the evaluation of LCC maintenance then QC&E Evaluators could train the initial DOV cadre in evaluation techniques. All MCCs would receive the training. The establishment of special maintenance-trained MCCs would place an unreasonable burden on the DOTS alert scheduling function. This would be because DOTS would have to match maintenance MCCs with malfunctioning LCCs. For this to be successful, DOTS Schedulers would have to be able to predict (at least several days in advance) which LCCs would have what equipment malfunctions.

Evaluations. Since maintenance was not part of MCCMs' primary duties, MCCMs should only be evaluated by "talking through" the appropriate maintenance procedure in the applicable technical data or checklist. Most MPT equipment rack drawers were mere mockups of the actual LCC drawers and therefore would be useless for removal and replacement performance evaluations. Since the locations and types of LCC equipment malfunctions could not be predicted in advance, it would be impractical to expect DOV Evaluators to schedule LCC drawer removal and replacements for purposes of evaluations. It would also be impractical to expect an MCC being evaluated in the LCC to disable working LCC electronic equipment solely for the purposes of an evaluation.

Inspections. Inspections of MCCM-performed LCC maintenance

should only be performed to the same extent and with the same frequency that any other missile field maintenance would be inspected. QC&E personnel only inspected a sample percentage of all maintenance. It would be an unreasonable use of QC&E or DOV personnel to expect them to inspect all instances of MCCM-performed LCC maintenance. The best method of inspection might be to make Flight Commanders (and/or selected DOV Evaluators) Certified Maintenance Inspectors. Then the Flight Commanders would be authorized to inspect MCCMs' maintenance and QC&E would not have to be involved.

Pre-positioning of Parts. Pre-positioning of replacement drawers at LCFs or LCCs would be impractical without greatly increasing the number of available drawers at each wing. Any available replacement drawers should be kept at Materiel Control, as is normal practice.

Maintenance Technical Data. To save duplication of existing resources, the existing maintenance technical data and checklists should be used by MCCMs. This documentation could be kept either by DOV or by DO9 since both of those agencies already had custody of other technical data.

Tools. The principal tools necessary for minor LCC maintenance would be the small hand tools already stored at LCCs.

Seals. Some drawers contained sensitive or classified components. These drawers had seals attached to their edges to provide evidence of tampering. The seals and seal installation kits were kept by Codes Division (DO9). There would be no reason to change this if the concept were implemented.

One Possible Scenario. The MCC on alert at an LCC reports an

equipment fault to Wing Job Control. Job Control and the applicable maintenance shop determine the fault can be repaired by removing and replacing a drawer. This information would be forwarded to DOTS, DOV, Codes Division, and Materiel Control. DOTS Schedulers would inform the MCC scheduled to relieve the present MCC that they would be transporting a drawer to the LCC when they go out for their alert tour. DOV would insure the availability of the proper technical data. Codes Division would insure the availability of seals, if applicable. Materiel Control would insure that a replacement drawer was indeed available for transportation.

In the morning, after their usual briefings, the relief MCC would go to DOV and get the technical data. They would then go to Codes Division, if applicable, to obtain seals and a seal kit. They would then go to Materiel Control and get the replacement drawer. Upon arrival in the LCC, the old MCC and the new MCC would work together to remove the old drawer and replace it with the new drawer. Job Control and/or the applicable maintenance shop would be in contact with the MCCMs during this time. Afterwards, the MCCMs would verify that the equipment was working properly by performing those sections of their usual equipment testing that affected the drawer. If the problem was fixed, the "old" MCC would bring the removed drawer back with them to the base, turn it in to Materiel Control, and return the technical data to DOV.

Further Recommendations. Any implementation attempt should try to minimize disturbance of the existing wing training and evaluation functions to avoid overloading MCCMs with extra training and to avoid overloading the DOTI/TTB and DOV/QC&E functions.

With the exception that would have to be made for female officer accessions (because women were not assigned to Minuteman MCCs), all new Missile Maintenance Officers should come from the pool of those MCCMs who had completed their 36 months to 48 months tour of duty. This would mean that all new Missile Maintenance officers would have had previous experience in the Minuteman weapon system and that MCCMs would have improved opportunities to remain in the ICBM career area. Further, implementation would give MCCMs who became Missile Maintenance Officers a prior knowledge of maintenance procedures, including a closer look at the functions of maintenance agencies like Job Control, Quality Control, and Materiel Control.

As several respondents warned, the more "low-key" the implementation of the concept was, the better its chances for success. Any extra safety training thought to be desirable could be taught during IQT and by DOTI at the wings. No inclusion of maintenance procedures in any evaluation by DOV or by higher headquarters should be permitted, except for "talking through" maintenance checklists without actually doing the maintenance. Any MCCM error detected during such a "talk-through" should never be assessed as anything but a minor error. This would make it difficult for MCCMs to fail an Evaluation solely because of maintenance errors. MCCM support for implementation could be greatly increased if MCCMs knew that they would not fail an Evaluation solely because of maintenance procedural errors.

The Wing Commander, the Deputy Commander for Maintenance (DCM), and the Deputy Commander for Operations (DO) at each wing should work together to determine precisely which maintenance procedures would be

performed by the MCCMs at that wing. The Wing Commander, DCM, and DO should have final decision-making authority in this area, subject to higher headquarters approval. This would give control of MCCM maintenance planning to the individuals who knew their wing best. It would also give wing personnel a feeling that their wing had inputs into the implementation process.

Future Studies. Future studies should be done to answer the following questions raised in this study:

- Is a third crew member needed on MCCs to handle increases in the MCCM LCC workload due to C<sup>3</sup> AFSATCOM modifications?
- Would it be practical to integrate the officer 18XX (operations) and 31XX (maintenance) career fields into one career field? Under this concept, missile officers would move back and forth between assignments in the operations and maintenance areas. What would the benefits be of such a program?

## Appendix A: Questionnaire

HQ USAF Survey Control Number (SCN) 84-39

A proposal is currently being studied that, if implemented, would allow capsule crews to perform some of the LCC maintenance. This maintenance might include such things as removing and replacing drawers in equipment racks, removing and replacing printers and classified computer drawers, and removing and replacing HF radios, UHF radios, and MF radios. It probably would NOT include heavy PMI items such as battery inspections, and would not include removal and replacement of SACCs or SLFCS equipment or any maintenance that involved using electronic test equipment such as DVMs, etc. This survey data will be converted to information for use in research of management related problems. Results of the research, based on the data provided, will be included in written master's theses and may also be included in published articles, reports, or texts. Distribution of the results of the research, based on the survey data, whether in written form or presented orally, will be unlimited.

Participation in this survey is entirely voluntary. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

Please answer the following questions:

1. To what base are you assigned?

- \_\_\_\_ a) Ellsworth.
- \_\_\_\_ b) FE Warren.
- \_\_\_\_ c) Grand Forks.
- \_\_\_\_ d) Malmstrom.
- \_\_\_\_ e) Minot.
- \_\_\_\_ f) Whiteman.

2. What is your duty AFSC?

- \_\_\_\_ a) 18XX.
- \_\_\_\_ b) 31XX.
- \_\_\_\_ c) 3167X.
- \_\_\_\_ d) 44570.
- \_\_\_\_ e) 99601.
- \_\_\_\_ f) 44599.
- \_\_\_\_ g) 31699.
- \_\_\_\_ h) Other (please identify) \_\_\_\_\_.



3. What is your grade?

- \_\_\_\_\_ a) Staff Sergeant.
- \_\_\_\_\_ b) Technical Sergeant.
- \_\_\_\_\_ c) Master Sergeant.
- \_\_\_\_\_ d) Senior Master Sergeant.
- \_\_\_\_\_ e) Chief Master Sergeant.
- \_\_\_\_\_ f) Second Lieutenant.
- \_\_\_\_\_ g) First Lieutenant.
- \_\_\_\_\_ h) Captain.
- \_\_\_\_\_ i) Major.
- \_\_\_\_\_ j) Lieutenant Colonel.
- \_\_\_\_\_ k) Colonel.
- \_\_\_\_\_ l) Other (please identify) \_\_\_\_\_.

4. (This question is for enlisted personnel only.) What is your skill level?

- \_\_\_\_\_ a) 7-level.
- \_\_\_\_\_ b) 9-level.

5. Which of the following best describes your squadron assignment?

- \_\_\_\_\_ a) Not assigned to a squadron - I work in the DCM complex.
- \_\_\_\_\_ b) Not assigned to a squadron - I work in the DO complex.
- \_\_\_\_\_ c) I am assigned to a maintenance squadron (FMMS or OMMS).
- \_\_\_\_\_ d) I am assigned to an SMS squadron.
- \_\_\_\_\_ e) I am assigned to \_\_\_\_\_.

6. If you work in the DCM complex but not in a maintenance squadron, to which of the following are you assigned?

- \_\_\_\_\_ a) I do not work in the DCM complex.
- \_\_\_\_\_ b) Maintenance Control Division.
- \_\_\_\_\_ c) Maintenance Support Division.
- \_\_\_\_\_ d) Quality Control Division.
- \_\_\_\_\_ e) Training Control Division.
- \_\_\_\_\_ f) I work directly for the DCM.
- \_\_\_\_\_ g) I am assigned to \_\_\_\_\_.

7. If you work in the DO complex but not in an SMS squadron, to which of the following are you assigned?

- \_\_\_\_\_ a) I do not work in the DO complex.
- \_\_\_\_\_ b) DOV.
- \_\_\_\_\_ c) DOTI.
- \_\_\_\_\_ d) DOTM, DOTs, or other DOT besides DOTI.
- \_\_\_\_\_ e) DO9.
- \_\_\_\_\_ f) DO22.
- \_\_\_\_\_ g) DO24.
- \_\_\_\_\_ h) Strategic Missile Squadron.
- \_\_\_\_\_ i) I am assigned to \_\_\_\_\_.

8. (The next 3 questions are for 182X duty AFSCs only. All other AFSCs, proceed to Question 11.) To what type of crew are you presently assigned?

- a) Evaluator (DOV) crew.
- b) Instructor (DOTI) crew.
- c) Flight Commander's crew.
- d) Line crew.
- e) I am assigned to -----.

9. (This question is for 182X duty AFSCs only.) What is your crew position?

- a) MCCC.
- b) DMCCC.
- c) I am dual-qualified as MCCC and DMCCC.
- d) Other - -----.

10. (This question is for 182X AFSCs only.) How many months cumulative experience do you have on crew?

- a) Less than 6 months.
- b) 6 months but less than 12 months.
- c) 12 months but less than 24 months.
- d) 24 months but less than 36 months.
- e) 36 months or more.

11. Which one of the following most closely approximates your job title?

- a) Team Chief.
- b) Shop Chief.
- c) Missile Maintenance Technician.
- d) Branch Chief or Assistant Branch Chief.
- e) NCOIC or ANCOIC.
- f) OIC or AOIC.
- g) Squadron Executive Officer.
- h) Squadron Operations Officer.
- i) Squadron Commander.
- j) Flight Commander.
- k) Chief of Maintenance.
- l) Maintenance Supervisor.
- m) Maintenance Superintendent.
- n) DOV MCCC.
- o) DOV DMCCC.
- p) DOTI MCCC.
- q) DOTI DMCCC.
- r) Flight Commander's Deputy.
- s) Line MCCC.
- t) Line DMCCC.
- u) Staff Officer.
- v) Maintenance Officer.
- w) My job title is -----.

12. How many months have you been in your present job?

- \_\_\_\_\_a) Less than 6 months.
- \_\_\_\_\_b) 6 but less than 12 months.
- \_\_\_\_\_c) 12 but less than 24 months.
- \_\_\_\_\_d) 24 months but less than 36 months.
- \_\_\_\_\_e) 36 months or more.

13. How many years (total) do you have in Minuteman maintenance?

- \_\_\_\_\_a) I have never been in Minuteman maintenance.
- \_\_\_\_\_b) Less than 2 years.
- \_\_\_\_\_c) 2 but less than 4 years.
- \_\_\_\_\_d) 4 but less than 6 years.
- \_\_\_\_\_e) 6 but less than 10 years.
- \_\_\_\_\_f) 10 years or more.

QUESTION 14 IS ONLY FOR OFFICERS IN MISSILE MAINTENANCE (31XX).

14. Do you have prior experience in ICBM Operations (any weapons system)?

- \_\_\_\_\_a) No experience in Missile Operations.
- \_\_\_\_\_b) Yes, as an 182X only.
- \_\_\_\_\_c) Yes, as an 183X only.
- \_\_\_\_\_d) Yes, as both 182X and 183X.
- \_\_\_\_\_e) Yes, as 182X, 183X, and 181X.
- \_\_\_\_\_f) Yes (please identify): \_\_\_\_\_.

QUESTION 15 IS ONLY MISSILE OPERATIONS OFFICERS (18XX).

15. Do you have any ICBM maintenance experience (any weapons system)?

- \_\_\_\_\_a) No prior experience in ICBM maintenance.
- \_\_\_\_\_b) Yes, as a 31XX.
- \_\_\_\_\_c) Yes, enlisted AFSC(s) only.
- \_\_\_\_\_d) Yes, enlisted AFSC(s) and as a 31XX.
- \_\_\_\_\_e) Yes (please identify): \_\_\_\_\_.

Answering directions for question 16 to 46:

The following questions should be answered by circling the appropriate letter "a", "b", "c", "d", or "e." Answer "a" means you strongly disagree, "b" means you tend to disagree, "c" means you neither agree nor disagree, "d" means you tend to agree, and "e" means you strongly agree.

- (a) Strongly disagree with this statement.
- (b) Tend to disagree with this statement.
- (c) Neither agree nor disagree with this statement.
- (d) Tend to agree with this statement.
- (e) Strongly agree with this statement.

16. Once they were properly trained, crew members could probably perform LCC maintenance as well as maintenance personnel do.

a b c d e

17. Capsule crews should not be tasked with maintenance. Operations and maintenance should not be mixed.

a b c d e

18. I would feel better about the idea of capsule crews performing LCC maintenance if I knew that maintenance or QC personnel would inspect the finished work.

a b c d e

19. Work done by a maintenance-qualified capsule crew would not have to be inspected any more often than work done by anybody else.

a b c d e

20. The quality of maintenance performed by a capsule crew would probably NOT be as good as the quality of the maintenance performed by maintenance personnel.

a b c d e

21. Capsule crews might help to decrease the maintenance workload if they were tasked with performing some types of LCC maintenance.

a b c d e

22. The whole idea of capsule crews performing any maintenance is more trouble than it is worth.

a b c d e

23. Capsule crews could help decrease LCC equipment downtime if they were authorized to remove and replace certain equipment drawers in the LCC.

a b c d e

THE FOLLOWING QUESTION (24) IS FOR TTB (maintenance) AND DOTI (operations) PERSONNEL ONLY.

24. The training of capsule crews in maintenance tasks would probably impose a greater workload on my work center.

a b c d e

- (a) Strongly disagree with this statement.
- (b) Tend to disagree with this statement.
- (c) Neither agree nor disagree with this statement.
- (d) Tend to agree with this statement.
- (e) Strongly agree with this statement.

THE FOLLOWING QUESTION (25) IS FOR QC&E (maintenance) AND DOV (operations) PERSONNEL ONLY.

25. The inspection and evaluation of capsule crews who performed LCC maintenance tasks would probably impose a greater workload on my work center.

a    b    c    d    e

26. The training of capsule crews who performed LCC maintenance could impose a burden on wing training functions that would be all out of proportion to any possible gains that might result from such a program, at least in the short term.

a    b    c    d    e

27. The evaluation of capsule crews who performed LCC maintenance could impose a burden on wing evaluation functions that would be all out of proportion to any possible gains that might result from such a program, at least in the short term.

a    b    c    d    e

28. I would be uncomfortable knowing that capsule crews were removing and replacing equipment in the LCC, whether or not they were trained and authorized to do so.

a    b    c    d    e

29. If maintenance personnel weren't always having to remove and replace drawers in the LCC, they could get to the more involved maintenance sooner.

a    b    c    d    e

30. A capsule crew performing maintenance would probably do a poor job and end up causing even more work for maintenance personnel.

a    b    c    d    e

31. If capsule crews performed some of the LCC maintenance, then maintenance personnel wouldn't have to make as many trips to the LCCs.

a    b    c    d    e

32. Capsule crews really don't have the time while out on alert to perform any maintenance.

a    b    c    d    e

33. If capsule crews were maintenance qualified, maintenance resources could be allocated more effectively.

a    b    c    d    e

- (a) Strongly disagree with this statement.
- (b) Tend to disagree with this statement.
- (c) Neither agree nor disagree with this statement.
- (d) Tend to agree with this statement.
- (e) Strongly agree with this statement.

34. If capsule crews replaced certain drawers in equipment racks, a mandatory inspection by qualified maintenance personnel should always follow.

a b c d e

35. Capsule crews should stick to operations and leave the maintenance to maintenance personnel.

a b c d e

IF YOU ARE NOT AN 182X DUTY AFSC, PLEASE SKIP TO QUESTION 39.  
182Xs, PLEASE CONTINUE THROUGH QUESTION 46, USING THE SAME "a" THROUGH "e" SCALE AS BEFORE.

36. The last thing I would want to do on an alert would be to perform maintenance.

a b c d e

37. Performing maintenance and being trained in maintenance tasks would degrade my performance in my primary duties.

a b c d e

38. Removing or replacing a drawer on a command and control console would be a very different kind of task than anything else I do while on alert in the LCC.

a b c d e

39. Performing simple maintenance tasks while on alert would take time away from my performance of other essential duties.

a b c d e

40. If my LCC had an inoperative computer, console, or status monitoring device; I would rather be authorized to remove and replace the bad drawer myself (and thereby fix the problem) than possibly wait several days for a "real" maintenance team to do it.

a b c d e

41. I would be uncomfortable with the idea of performing maintenance such as that described in Question #40, even if I were authorized and trained to do so.

a b c d e

42. Once MCCMs were tasked with maintenance, they would be given more and more maintenance to do, with the result that MCCMs would eventually be regarded as maintenance personnel.

a b c d e

- (a) Strongly disagree with this statement.
- (b) Tend to disagree with this statement.
- (c) Neither agree nor disagree with this statement.
- (d) Tend to agree with this statement.
- (e) Strongly agree with this statement.

43. MCCMs who were being trained to perform maintenance tasks would have to be given the same hands-on training maintenance personnel receive.

a   b   c   d   e

Please answer questions 44, 45, and 46 below as though they completed the following sentences:

"I would be more comfortable with the idea of performing simple LCC maintenance if I"

44. I had the authority to delay performing such maintenance if I personally thought that some other duty was more urgent right then.

a   b   c   d   e

45. Clear-cut lines of authority were understood by everybody involved, so that I would not be given conflicting orders by Job Control, DO agencies, and my squadron.

a   b   c   d   e

46. The completed work that I had done was always inspected by qualified maintenance personnel as soon as possible.

a   b   c   d   e

QUESTION 46 WAS THE LAST QUESTION USING THE "a" THROUGH "e" SCALE. PLEASE CONTINUE THROUGH QUESTION 63.

For questions 47 through 58, use this answer key:

- a) None, 0 hours.
- b) Less than 2 hours.
- c) 2 hours but less than 4 hours.
- d) 4 hours but less than 6 hours.
- e) 6 hours but less than 8 hours.
- f) 8 hours but less than 10 hours.
- g) 10 hours but less than 12 hours.
- h) 12 hours but less than 16 hours.
- i) 16 hours but less than 20 hours.
- j) 20 hours or more.

How many hours out of your last alert did you spend doing this activity?:

- \_\_\_\_47. Training (i.e., self-study or training others).
- \_\_\_\_48. Inspections and tests of LCC equipment.
- \_\_\_\_49. Processing messages.
- \_\_\_\_50. Testing and calibrating missiles and LF equipment.
- \_\_\_\_51. Processing faults, both LF and LCC.
- \_\_\_\_52. Processing trips on and off LFs, and monitoring their activity.
- \_\_\_\_53. Educational activities such as MMEP, PNE/SOS, etc.
- \_\_\_\_54. Rest status.
- \_\_\_\_55. Cleaning and housekeeping.
- \_\_\_\_56. Updating LCC records, "a"-paging T.O.s, and related duties.
- \_\_\_\_57. Free time (recreational reading, watching television, etc.)  
Do not include time spent in rest status.
- \_\_\_\_58. Processing security situations.

59. If capsule crews performed LCC maintenance, the completed maintenance should always have to be inspected by:

- \_\_\_\_a) The next capsule crew, and later by the Flight Commander.
- \_\_\_\_b) Qualified Maintenance personnel only.
- \_\_\_\_c) QC&E maintenance personnel.
- \_\_\_\_d) DOTI or DOV personnel.
- \_\_\_\_e) a and b above.
- \_\_\_\_f) b and c above.
- \_\_\_\_g) No inspection is necessary if the equipment works properly.
- \_\_\_\_h) Other (please explain in the space provided):



60. If capsule crews performed LCC maintenance:

- a) N/A, crews should not perform maintenance.
- b) All crews should be trained to perform all of the assigned maintenance tasks.
- c) Only certain crews should be trained to perform maintenance.
- d) Other (please explain in the space provided):

61. Capsule crews who were being trained to perform maintenance should be trained by:

- a) N/A, capsule crews should not perform maintenance.
- b) DOTI Instructor Crews only.
- c) DOTI Instructor Crews, with Team Training Branch (TTB) personnel observing the training and assisting as necessary.
- d) DOTI Instructor Crews, with Team Training Branch (TTB) personnel giving hands-on training to the capsule crews.
- e) Team Training Branch personnel only.
- f) Team Training Branch personnel, with DOTI Instructor Crews observing the training and assisting as necessary.
- g) Team Training Branch personnel, with DOTI Instructor Crews giving hands-on training to the capsule crews.
- h) Other (please explain in the place provided):

62. Capsule crews who were being evaluated on maintenance task performance should be evaluated by:

- \_\_\_\_\_ a) N/A, capsule crews should not perform maintenance.
- \_\_\_\_\_ b) Evaluator Crews (DOV) only.
- \_\_\_\_\_ c) Evaluator Crews (DOV), with QC&E maintenance personnel observing the evaluation.
- \_\_\_\_\_ d) QC&E maintenance personnel, with DOV crew observing.
- \_\_\_\_\_ e) QC&E maintenance personnel only.
- \_\_\_\_\_ f) Other (please explain in the space provided):

63. Use this space for any comments you might have about the idea of capsule crews performing maintenance in the LCC, or to discuss any area you feel the survey did not adequately cover. Thank you for your valuable time and attention.

Appendix B: Comments from Question #63

Flight Commander: Who is going to take the HEAT when a capsule crew messes up a piece of equipment worth 15,000 dollars? Their job is be prepared (sic) to launch ICBM's (sic) upon lawful order (sic). The number of tasks that can be presented in an evaluation is already unbelievable.

SMS Squadron Commander: I can think of no reason why MCCs should not perform minor maintenance.

Deputy Commander for Maintenance: LONG OVERDUE. NO BIG DEAL. JUST DO IT!

MCDIC LF Electronics Branch: Let's not diversity (sic) so much as to cause a lot of problems. Ops crews should take care of ops. Maintenance should take care of maintenance. Let's not go round robin on this thing. First qualify capsules then later decertify because of the impact.

Chief, QC Division: I don't have a strong objection to crew members doing some remove and replace maintenance actions. Routine actions would save maintenance dispatches, but crew members will have very limited ability to react to abnormal indications after maintenance.

Air Division Staff Officer: I believe that capsule crews are perfectly capable of performing maintenance in the LCCs, but I don't think they should. I believe the performance of maintenance tasks, the lugging of drawers to and from the capsules, and problems involved with bad replacement equipment would detract from the development of a professional crew force.

Wing Maintenance Superintendent: Capsule crews performing maintenance should be limited to drawer and minor component removal and replacement. Replacing minor hardware, tightening screws etc, should also be included.

Line MCCC: Once capsule crews started performing LCC maintenance, the only result would be that maintenance personnel would get more time off than they are now (sic). Most maintenance teams now spend about 1/2 of their dispatch time in the LCF goofing off - not performing maintenance. This survey would not even be necessary if mnx supervisors kept their personnel away from the LCF pool tables and kept tabs of their (sic) time on dispatches. Our Stand Boards are rough enough without being evaluated on maintenance tasks. You can tell this survey was designed by a person no longer pulling alert duty.

OIC Training Control Division: I assume that you meant major LCC equipment. Currently, crew members perform limited maintenance on comm equipment. I made that assumption in answering your questions.

The biggest problem in crews performing mx is that the time it would take to generate a team to bring the drawer out to the LCC is not much less than the time it would take to generate a qualified mx team. Frequently, the limiting factor is availability of a serviceable drawer - not a qualified team. Also, you can't view a drawer R&R as an isolated function. Most certainly there would be equipment isolation or shutdown requirements involved. This would require additional training for the crews - not only in the actual checklists, but also from a systems knowledge viewpoint. You don't want somebody pulling a drawer without knowing the system impact. Currently, you don't get that at Vandenberg, because they almost exclusively emphasize procedures and not system operation.

Another problem is the tech data. Certainly you can't include these procedures into the crew T.O. They would have to double or triple the size of their T.O. Maintenance teams normally carry a T.O. kit that probably weighs 20-30 pounds. Although their T.O.s address many other procedures other than LCC mx, my point is that it would be difficult to have a workable system for crew access to the proper T.O.s.

The idea of crews performing more mx at the LCC is attractive and I support it - regardless of the way I answered the questionnaire. However, there are too many problems to be worked out for the concept to be, in my mind, feasible.

NCOIC Technical Engineering Branch: Crew members are currently required to remove and replace certain panels in the LCC due to code handling requirement - I feel this could be expanded to include other selected components in the LCC with no detrimental effects on the weapon system.

SNS Squadron Commander: I am opposed to the notion of capsule crews performing maintenance because it will require a significant amount of additional training - a burden that existing crew schedules can ill afford. In Titan, the crew was augmented by two NCOs whose primary function was maintenance related. The existing concern about maintaining crew proficiency in weapon system, EWO, codes, nuclear safety, safety, COMSEC, admin, disaster preparedness, terrorist threat, and security would only be exacerbated. The present system is working - look at our LCC operational rates - so why mess with it?

An item not addressed by your questionnaire is how the replacement drawers are going to be hauled out to the sites. Will crews have to go by maintenance to pick up the equipment adding further delay to the changeover process? Will they be held responsible for transporting the equipment to and from the sites?

A final question: Is maintenance work consistent with the Air Force concept of an "officer?"

Flight Commander's Deputy: First, maintenance must be done on a limited basis, ie, replacing a drawer. If this is done, equipment downtime could be reduced with a savings in dispatching fewer teams. Concerning inspection of the maintenance done by MCCMs, it may be good to check on the work but keep it from being an evaluated item. Note that MCCMs should be able to determine when to put in the equipment or to do

maintenance. Refer to Question #44. Although total times indicated in Questions 47-58 may seem short, some activities (processing messages) are broken into several smaller parts. For example, while doing LCC maintenance, MCCM may have to process a message, respond to LF maintenance requests and process security at the same time. This is not unusual. Remember, MCCMs already have enough to be concerned with while on alert. Don't be surprised if there may be an overall negative response to this survey.

Wing Weapons Safety Officer: This program could be a boon to the maintenance community. I see three problems: 1) increased workload on instructors/evaluators (MB and DO), 2) increased safety training requirements, 3) decreased time during alert to accomplish self-study (END, SOS, MNEP). I would jump at the chance to get hands-on maintenance experience if I were on crew today.

SMS Squadron Commander: I see no problems with drawer, etc, replacement. The Minuteman system was largely designed as a modular, R&R system, with actual maintenance done on base or at depot. If a drawer is replaced and it works - then no problem. Many times, simply reseating a drawer solves the problem.

DO9 Officer Codes Controller: This is my first assignment to a Minuteman unit. My crew time was spent in the Titan II system where we worked much closer with maintenance teams as well as being required to perform many small maintenance tasks on our own. I am still AMAZED at how LITTLE the Minuteman crews know about the operation of their weapon system, especially the capsule. I strongly urge that Minuteman crews be given SOME training in maintenance procedures, even if they will not be allowed to perform maintenance functions.

DOTI MCCC: Missile Crews Have One Job - Maintain and Be Prepared to Launch Minuteman Missiles upon Lawful Order (sic) - Do Aircraft Crews fix their own Planes?

Line MCCC: ... I don't want to be responsible for a 15 million drawer and have to pay for it the rest of my life. I also feel that maintenance would become our primary duty if we start on the simple cases. Keep the two shops separate.

Line MCCC: We ops officers didn't go through four years of college to turn a GOD-DAMN WRENCH! Obviously maintenance is trying to get out of doing their job and getting us to do it for them! Missile crews don't have the TIME on alert to be trained in maintenance procedures and to accomplish them in the field!! Remember the C<sup>3</sup> modifications - SAC was already considering adding a third crew member to each crew because the crews are already overtasked - HOW IN THE HELL can you even consider adding more duties? Are you crazy?

OHMS Shop Chief: ...every time I go down to the LCC the MCCMs are sitting around in their pajamas reading dirty magazines...they have plenty of free time!...

DO9 Officer Codes Controller: ...the additional training it would take to make MCCMs into qualified maintenance personnel for designated LCC tasks would not only be a burden to DOTI and DOTB Scheduling but also be more additional strain on the crew members. Leave maintenance to maintenance and give crew members some time with their families. Flyers do not perform maintenance so why should MCCMs?

DO9 Officer Codes Controller: ...Crews are already trained in much of what they need to know to accomplish these tasks; ie, they are already trained in reseating certain drawers in the LCC. Removing and replacing the drawer is not much different! Also, they are already trained on some power-down procedures, such as LCFP Shutdown and Startup, LCC Shutdown, etc. I strongly believe that crews should be given general training on drawer R&Rs, etc, and that this general training could be applied in many situations. Let's not forget that we are dealing with a bright, well-educated group of people here. Another idea is that crews could be "talked" through some procedures over the phone...It seems that the major thrust behind this idea is to reduce the maintenance workload by letting the crews perform some relatively simple tasks (tasks that they could almost certainly perform anyway if it wasn't prohibited by regulation or T.O.), in the interest of more efficient mission accomplishment. Let's not get so hung up over the training/evaluation question that we let it overshadow the mission.

Wing Assistant for Inspection Matters: I have no problem with the concept. Priorities & complexities of tasks allowed could be worked out - that is not an insurmountable problem. Old, deeply-ingrained parochialisms within MB and DO will die slowly. Objective analyses should prevail in making this system decision. My last assignment had me working "ops" & "mx" tasks with missions & hardware in the Airborne Laser Laboratory program. I found it stimulating, technologically, to be involved in both sides of the system. I also found my knowledge of the overall system got better & that, in turn, improved my "ops" skills. I was authorized up to, & including, to remove drawers, modules, & sensors during flight. NEVER did any problem arise. HOWEVER, it should be remembered all of us in that program were scientists or engineers. Hardware concepts & handling are much more akin to that groups' background than to the spectrum of degree backgrounds encountered 18XX AFSCs (e.g., Bible Theology to Psychology with a smattering of us technology types). This topic could easily generate a whole spectrum of discussion. Thanks for the chance to say a few words. (signed)

Major, AOIC, Plans and Intelligence Division: Not all officers have the mechanical ability or the mechanical confidence needed to accomplish maintenance tasks. Don't force these individuals to do maintenance. However, many officers have the ability and desire to save unnecessary maintenance dispatches by performing limited maintenance. The threat of being evaluated is a BIG deterrent to this concept. Don't evaluate them on maintenance task performance. Also, I think it is important to give our officers the permission to "legally" perform minor maintenance without the hammer over their heads of evaluation or certain types of

liability. It is equally important to allow those individuals who do not wish to perform maintenance (for various reasons) not to perform maintenance.

NCOIC of an OMMS shop: GREAT! I think this should have been done years ago. I can foresee some problems but with professionals working together with open minds, the product (sic) of ops crews performing certain tasks in the LCC would solve many problems with enlisted maintenance team delays (scheduling) and give MCCMs a better insight into how an LCC runs.

Maintenance Superintendent, QC Division: Only carefully selected tasks should be considered for capsule crews to perform. None that require use of test equipment, only a functional check. This idea has merit and should be implemented.

Branch Chief, QC Division: I'm not against capsule crews performing hardware maintenance. Examples: loose screws, missing screws, or replacing broken latches. They could repair their own crew chairs but as for replacing components that should be out of the question...The Air Force has YET to have a training program to keep the maintenance technicians proficient let alone trying to add another partly trained person start working (sic) on equipment.

NCOIC, QC Division: This is an Outstanding Idea!! Common Sense seems to be gradually sneaking in.

Shop Chief in FMMS: Crews change over every day. The oncoming crew could bring out a serviceable drawer, R&R, and the off duty crew returns the unserviceable item to maintenance processing. The above would save much time, money, and maintenance resources better used to correct, in a timely manner, more involved and time consuming maintenance. It's a GOOD idea!

NCO in Maintenance Support Division: MCCMs already change the Launch Enable Control Group (LECG), the Launch Control Panel (LCP), and the Secure Data Unit (SDU) Keying Variable in the Coder-Decoder Indicator drawer. The difference between changing these items and other equipment drawers would be the size and weight of the equipment and the peculiar shutdown required for each piece of equipment.

Shop Chief in FMMS: Many tasks in the LCC are very basic. ...currently, it takes many man-hours for a maintenance team to load their truck, drive to the LCC, drive home and unload the truck...a qualified capsule crew could take a drawer...with them, do the task when they had time, then bring the items back to the support base when they returned.

DOTI DMCCC: ...To add maintenance in with ops activities would only serve to degrade ops and maintenance (sic) and would certainly frustrate many MCCMs.

NCOIC Maintenance Control Division: Good idea but let's keep it simple. Drawer changes and simple hardware such as knobs would help both maintenance and operations. Any really involved tasks should be left in maintenance (sic).

FMMS Maintenance Superintendent: The idea is very good and merits serious consideration.

NCO in Training Control Division (TTB): I think that the crews could do the maintenance but would have to follow the same eval program that maintenance does.

DOTI DMCCC: Crews should not be evaluated. MCCMs should be tasked with maintenance only during times when no other maintenance teams were available...crews should do this as a last resort and it should be looked upon as a "favor" to Wing Job Control. This is why I stress that all maintenance done by MCCMs should be inspected ASAP by qualified maintenance personnel.

DOTI MCCC: This whole idea is just a bad joke, right? ...I'm quite confident that DOTI and DOV between them could pervert the original concept beyond the point where any real benefit could be had. I've seen this happen before. When C<sup>3</sup> was installed in the LCCs, it quickly became a nightmare for the crews to operate. Quite bluntly (sic); performing LCC maintenance would be just another pain in the ass we don't need.

DOTI MCCC: ...Great idea! But it is unfair and unrealistic given current crew structure and manning. If it were possible to add a maintenance/communications officer/NCO to each crew then it might be possible. You might also make the LCC larger.

DOTM MPTD: ...tell me what's in it for the good ole capsule crew? With EWO, weapon system, security, and the maintenance we are already responsible for the MCCM has more than enough to do already. If you thought up this spastic idea then it's obvious you don't (sic).

SMS Squadron Operations Officer: ...Crew members are operators, not maintenance personnel. They live by a totally different approach to their work environment. Merging the two thought processes could cause some real trouble. Operators react to status, they do not troubleshoot the way that maintenance people do.

DOTI MCCC: Good idea - but it will never happen! I don't know how many times a PMI crew has come out to the LCF and broken more than they fixed.

NCOIC of E-LAB: As an E-Lab technician, I have seen many drawers damaged by capsule crews, ie, lamp sockets shorted due to bulbs changed with power applied, recorders with paper installed backwards, or with scotch tape, knobs cracked by turning too far, etc. - even keyboards with damage due to coffee spills. I don't think officers have the common



sense to be performing maintenance!

Maintenance Instructional Systems Manager, Training Control Division: I think that this is a viable proposal! However, the "list of tasks" to be performed by MCCMs would have to be very carefully constructed.

Branch Chief in OMMS: Great idea. We now have crews bringing in their own chairs for repair. Really speeds up process for lower priority work.

TTB Instructors:...all in all, I don't think that capsule crews should have to do maintenance. They have a broad enough area to learn and stay proficient in without increasing their load.

Maintenance Controller, Wing Job Control: Although the idea warrants consideration the time, money, and results from this program would not be significant enough.

Line DMCCC: Capsule crews' duty is to OPERATE the weapon system, not repair it.

Wing Maintenance Superintendents: Give the ops crews a banana and they'll follow any checklist! Let MCCMs go through the OJT program and all the paperwork (ie, trash) associated with it. They might benefit from the exposure and (who knows?) - eventually a rapport may be established between mnx and ops as exists between a fighter pilot and his crew chief. It IS getting better! It's about time - if an ops crew can turn power on and off to an equipment rack it would greatly help mnx teams do the troubleshooting procedures...Tighten screws, nuts and bolts could be (sic) easily done by ops once they knew how to turn a wrench or a screwdriver...It is DUMB to send a mnx team 50-100 miles to tighten a nut or a bolt, but the "system" used allows us to do just that.

NCOIC QC Division: Let the Facility Manager do it and I could feel better about the idea.

Training NCO, TTB: Having trained DOTI Instructor Crews on this concept some 2-3 years ago, I feel that capsule crews could effectively handle the load, saving maintenance many extra dispatches...I would strongly suggest that the maintenance concept already pictured in this survey be allowed to stand. I feel attempts to add more work would degrade operations. The DOTI officers that I worked with quickly grasped the concepts, also had an excellent understanding of the maintenance, and I feel they could train their counterparts with little or no problems. Thank you.

TTB Branch Chief: We are all part of the team, let's work together for a common goal. It would be great to allow crews to do maintenance...many items could be done by anyone with little or no training. My biggest fear is that if something goes wrong...we will be

at each others' throat...

DOTI MCCC: ...Believe me, crew duty with operations is plenty, this could make it unbearable. Even so I'm for it, but only if GOOD managers are there to oversee it...Please contact me if you are interested in a man with four years ops experience and a genuine desire to help.

MCOIC TTB: ...I would like to see capsule crews be able to R&R DSAP printers and possibly some CMPG maintenance. The CSMPG and power supply group racks should be left for maintenance teams to work on because of the extensive checkout procedures and T-tapes involved.

Chief of Safety: Changing drawers is not a difficult task, there is no reason this can't be done by crews - if problems develop or a drawer doesn't work like it should - i.e. with tech data checkout - then call Job Control for directions. This has been a sound and very workable concept that has had people shooting at it rather than trying to make it work. Hope your effort helps.

DOT Branch Chief: There are many minor tasks that crews could perform...capsule crews aren't dummies and they won't perform as dummies unless we treat them as dummies...upon occasion, simple problems crop up that could be easily handled by the capsule crew...don't think they need to be evaluated on the simple tasks they would perform.

DOV MCCC: I have been a strong advocate of MCCMs accomplishing LCC maintenance for over three years...I believe you'll encounter opposition to the idea only because of the fear that - "if the capsule crew can remove drawers, etc, they can do more involved maintenance." I believe crews CAN and SHOULD accomplish MINOR maintenance that can be accomplished within MINUTES! This is very important - we can't possibly be responsible for accomplishing major or time-consuming maintenance without sacrificing the ops side.

Chief of DOTM: If a missile crew can save a maintenance team a 100 mile drive by removing & replacing an equipment drawer, it makes sense to use them. However, I strongly urge you to limit the crews' responsibility to just this.

Chief of Plans and Intelligence: Have the crews bring out the equipment, but have the facility manager install it, etc.

DOV MCCC: Since anonymity is assured, I'll give you some feedback. I've been here 3 1/2 years. I was trained by some of the "old guys". In my time, I've repaired lots of little things in the capsule, some with telephone guidance from Job Control, some based on watching a team fix it and others just by studying tech data and experimenting. ...all of it was unauthorized, but it was done right, saved a dispatch, and got the stuff working. ...this is all minor stuff, mostly adjustments, etc, but I know it happens. I'm not alone, several do more than I do because they know more. We should be trained and taught to do this stuff - so long as it's kept to a reasonable level and doesn't interfere with the

operations work!

Maintenance Superintendent, Maintenance Control Division: I think the idea is very valid. There can be a lot gained from this! It isn't complicated at all - only several, repeat simple mechanical steps to be performed...Yes it's true maintenance teams wouldn't be at the LCCs as often, but they wouldn't be off - they would be out working problems they are really needed for.

OMMS Squadron DJT Monitor: I am not sure it would be wise to have an operator of a nuclear weapons system know more about the weapons system than is necessary to perform their mission...I think the old rumour was that it was a maintenance troop in training at Chanute that figured out how to launch the MPT with one vote...most capsule crews will not want to perform maintenance and those that do are dangerous to the weapon system.

Line MCCC: Why is it that Ops personnel are treated like 2nd class citizens? Do we SUPPORT maintenance personnel?

DOTS Branch Chief: Being an ex-Titan Instructor, I like the idea of limited maintenance. In Titan we were trained to troubleshoot, but not to accomplish a lot of hands-on maintenance. You must be very careful on what tasks the crews will be allowed to tackle. It would probably be more realistic for the crews to troubleshoot to an end item, so they could tell maintenance what drawer or replacement part to bring out.

Wing Maintenance Superintendent: Ops & mx tasks should remain separate functions - I was in Missile Ops in the ATLAS D where we also performed maintenance - This was not a good concept.

FMMS Branch Chief (Captain): Using capsule crews to perform maintenance such as drawer R&R could save much time and effort on the part of the maintenance deputate. Proper training and Quality Control is essential. Coordination through Wing Job Control would be required.

DOTI DMCCC: I feel that having crews performing maintenance tasks is a good idea. My biggest concern is that of evaluations...maintenance tasks should be evaluated separately, not as part of a regular recurring evaluation. Checks are difficult enough as it is.

Line MCCC: LCC maintenance is in my opinion a viable solution to the problem...a major part of this load is simple short tasks such as replacing the SDR printer (CDB)...set it up as an additional duty...these tasks should not be evaluated in any way.

Line MCCC: Why? There are already too many ways to fail an evaluation. MCCC'S ARE ALREADY OVER-TAXED!! We are out there for the sole purpose of fulfilling a commitment to deterrence (sic). Why give the MCCC's more responsibility?

NCOIC, Maintenance Support Division: ...Maintenance personnel are

just like capsule crews; some don't have the common sense to turn a wrench and need more training than others.

FMMS Branch Chief (SMS): ...tasks should be performed by capsule crews... that require little technical knowledge and no test equipment...Maintenance personnel attend a technical school where basic maintenance principles are taught...and some of them fail to achieve the requisite technical ability even after ample time is given in the field and completing TTB...even though some capsule crews may do an exceptional job, many may do more harm than good.

MCDIC Training Control Division: ...program should be closely monitored to assure this concept doesn't burden the capsule crew or hinder their operations.

Line MCCC: Unlike most of my friends I think this is a good idea. It could save a lot of dollars in addition to making crewmembers more familiar with the system they operate...a mistake to let DOV evaluate these tasks, their evaluations are bad enough already. Also unlike many MCCMs I do not have a problem with the weapon system. A SCIENCE & MATH BACKGROUND HAS HELPED ME CONSIDERABLY...it sounds like a good idea.

FMMS Squadron Commander: As a Chief of DO9 for nearly three years I found 18XX personnel quite capable of doing drawer changes in the CIV. My answers to your questions are based upon that exposure and a review of the LCC maintenance which was performed during my three years on crew. I expect an initial resistance to your idea, but it is workable. Good luck.

Chief of Maintenance Data (itLt): Changing drawers in the capsule does not require any special aptitude or mechanical abilities, only follow instructions properly.

DIC Maintenance Control Division: I...daily see problems arise because crews can't follow their own EMO/operations procedures, much less maintenance procedures. Case in point, just yesterday, we (Job Control) had to "talk through" the Enable Test Checklist with the crew at Juliett - I'm not exaggerating! We can't expect a crew to turn wrenches when they can't push buttons.

Deputy Commander for Maintenance: Crews already perform minor maintenance (light bulb R&Rs, floor-levelings) etc. Simple drawer R&Rs could be easily added to Ops T.O.s, could be easily trained, and could be easily evaluated under current procedures.

Chief, Training Control Division: LCC mx is only a small percentage of our work load. Gains would be negligible. Increase in training and evaluation would be great. Also there would be a pissing contest between ops and mx every time something would go wrong. You know what they say getting into a pissing contest with a skunk - no one wins. 95% of workload at LF. My opinion only.

Deputy Commander for Maintenance: Tasks should be absolute minimum. Some drawers, printers, LCC chair R&R. Even greater emphasis on NOT attempting unauthorized maintenance - like adjusting air flow, etc. We know it goes on.

Assistant Deputy Commander for Operations: Minuteman operations is the only weapon system function in which the operators are not encouraged to be more familiar with the weapon system and its functions. This is shortsighted and wrong. MCCs performing LCC maintenance may be the first step (long overdue) in removing this "log jam" attitude. The evaluation function of these new tasks would have to be realistic and practical. Need to teach the mechanics of the system (whys and wherefores) not just checklist steps.

Chief of Maintenance Control Division: I think this is a good idea - and long overdue. Many crews have a natural curiosity already about capsule maintenance procedures, and would be eager and willing students. Further, the concept of "checklist discipline" is already second nature to MCCs, so the training would go very smoothly.

OMMS Squadron Commander: Grand Forks tried to do this in a test program but 15AF/DO people shot it down. Drawer changes in the LCC by crews would probably release about three EMT dispatches per week for other wing maintenance. This is an excellent idea and should be pursued to the highest levels. If I can help let me know. (signed, with duty address and AUTOVON #)

Assistant DCM: I can't believe so much ado is being made (this was proposed six years ago that I am aware of, maybe sooner) over something that will prove to be so simple if implemented. The tasks are simple and the frequency low, and the time that it takes minimal. Yet if maintenance has to R&R drawer instead of crew, it takes 6-8 hours for the separate dispatch and adds no time to crew (except takes 1/2 to 1 hour of their time).

DOC Command Post Controller: I hope the crews don't get dumped on! Rivet Save came in (1977); doing the same job with 1/3 less people - the other 2/3 picked up the load. Crews now ought to belong to the Teamsters as much as they drive! Now this. In my eight years I've seen little support for MCCMs from higher headquarters. The training load will probably fall to local training. Standardized at all bases? Also the extra initial training has to be performed sometime, and recurring training has to fit in somewhere. To say nothing of the lower quality of accessions who can't read or write (officers!). It's a great idea if it doesn't go overboard. It's just as stupid to insist on a hands-off policy. We were insulted by SAC's insistence (1976-1978) that once a problem was called in, a maintenance team had to make a special trip out to verify the obvious write-up, then go back to base before the part would be issued. A Happy Medium Is Needed. A problem is identified as an end item in a drawer, let the new crew bring the drawer out, both crews could swap it at changeover, inspecting each other's work (the same as Top Secret EWO documents); then the old crew could

bring the bad drawer back the same day. Meanwhile, maintenance personnel are in the shop fixing the guts of the drawers instead of driving around the missile field. Please - no PMIs. Crew members are not grease monkeys, but commissioned agents of the President interested in minimum downtime so the mission of the USAF ICBM force is accomplished.

OMMS Branch Chief: When I was on crew there were plenty of times I felt I could have helped with some thing, e.g. printers...would probably never work in reality. Maintenance would view MCCMs as "Shade Tree" mechanics.

FMMS Branch Chief: Implementation of this proposal would ease the maintenance workload considerably, enhancing command and control. Downtime would be reduced. Sounds like a good idea if training and QC&E could be effectively worked.

Operations Staff Officer: Why not try the missile team concept. This would consist of two missile crews (182X), security police (FSC/ARTs), cook, facility manager, and an LCC-qualified maintenance team (2-3 enlisted) to function as a site (LCF) self-sufficient team for a 72-hour period to operate and maintain each LCF. Assign teams to operations flight commanders reporting to SMS squadron commanders. Reduce manning levels in all affected support squadrons and increase manning in 182X for SMS squadrons. Permanently assign security police, cooks, and missile maintenance personnel to operations deputate. In addition, provide responsibility pay for all MCCMs who pull alerts.

OIC, Quality Control Division: This idea is a long time coming. Anyone qualified in the missile business can and should be trained to accomplish R&R maintenance. Don't waste maintenance teams on simple tasks - the weapons system workload is too great for the number of teams presently available.

FMMS Maintenance Officer: I feel it is essential that MCCMs be trained in performing maintenance not only for the reasons listed in this survey...during wartime conditions when the capsule is down...the capsule crew may be the only ones available to fix the capsule in a speedy manner. Capsule crews should be more than just robots in following their T.O.s. If a crew were trained in maintenance, the knowledge gained could prevent...damage to the weapon system. Example: At FE Warren AFB, several racks of equipment burned up. The crew was not at fault...if they had had maintenance knowledge they might have saved the government millions of dollars.

Flight Commander: This is a good idea but I am against it because of the ABORTION that SAC and the evaluators would make of it. Unfortunately, good ideas cannot be considered in and of themselves, but must be considered in light of what SAC and its evaluation system makes of them. This is, unfortunately, a pain in the ass. The results of this GOOD IDEA - would be a quantum leap in failed evaluations! This is the reason I oppose it.

Line DMCCC: I would not trust some of my fellow MCCMs to change a light bulb...train only selected crews in maintenance.

Chief of DOT: Training should be joint DOTI/TTB function in the beginning. Eventually DOTI could assume the full training responsibility. QC&E should train DOV in evaluation of maintenance tasks and could observe DOV evaluations of same in the beginning, but only DOV should evaluate MCCMs. This is an idea whose time is long overdue!

DOV MCCC: Project Teamwork is a good idea! I have seen SDR printers inoperative for a week because they had no maintenance personnel to R&R the equipment...crews should be trained and evaluated by DOTI and DOV only...this should be limited maintenance only.

SMS Squadron Commander: My concern is that our weapon system...is complicated and the demands on MCCMs are ever increasing e.g. C<sup>3</sup> and AFSATCOM. I think that my crews are hard pressed as it is to keep up with the demands placed on them and to add maintenance tasks will make it even more difficult to maintain proficiency.

DO9 Officer Code Controller: If DO complex conducts & evaluates the training and activity, the DO complex would retain better "ownership" of the procedure...MCCMs are already performing numerous minor mx functions especially with communications equipment. Questions about "MCCMs should not perform mx" are not very realistic. Questions 47-58: You didn't ask how long they spent eating and drinking coffee. I had several DMCCCs who spent many hours in such activity.

Line MCCC: I am totally opposed to the idea of Minuteman MCCMs becoming involved in any type of maintenance whatsoever...Who is going to be responsible for the expensive...equipment that is broken...? ...Am I now working for the DCM or for the DO?...If I wanted to be involved in maintenance activities, I would have become an enlisted missile maintenance technician...this sort of thing does not fit into my career plans or inspirations. Personnel manning wonders "why" it is difficult to attract people into the missile operations career field, and these types of...proposals are exactly the "why." Crews are required to maintain absolutely "top-notch" proficiency and this sort of activity would detract from it.

Chief of DOT: I am opposed to the idea...the MCCM job is structured for the non-technical individual...

Deputy Commander for Maintenance: Initially, TTB trains DOTI who then trains MCCMs. Initially QC&E trains DOV. Once DOV is fully qualified, they alone would do the evaluation. If maintenance currently is required to check out the system then the crews should not do the task.

Flight Commanders:...As if an evaluation is not already a tedious, tension-filled experience, you choose to add more opportunities for

evaluation...long hours of additional training in the classroom and the field...No, the capsule crews have quite enough to do with training, maintaining proficiency, keeping marriages together, and taking care of families, and the daily duties required of all officers. There is no need to add more.

Flight Commander: ...If we could do it without being evaluated on it, I believe that most MCCMs would be for it...If we waited for maintenance to do everything, nothing would ever get done...

FMMS Maintenance Supervisor: There are vast differences between operations T.O.s and maintenance T.O.s...Prior to any maintenance by MCCMs, differences between T.O.s must be resolved...

FMMS Squadron Commander: An interesting concept and one whose time may have arrived. Suggest...you also consider the possibility of the Facility Manager as an excellent alternative to the crew members. Many FMs have numerous years of experience in maintenance-related fields...Your survey should reveal some interesting disagreements:

- Ops crews don't have the time.
- DOV vs QC&E doing evaluations.
- Mandatory maintenance followups on MCCM-accomplished maintenance.

Although I wouldn't hesitate to sign my name to your survey, I won't just to keep your sample pure.

OMMS Squadron Commander: I don't believe that MCCMs should perform maintenance for the following reasons:

- Training requirements would be disproportionate to benefits.
- Evaluation requirements would present problems for DOV...
- Tasks would not be performed often enough to maintain proficiency...

FMMS Maintenance Supervisor: If we can teach 18 year olds how to properly perform maintenance...there is no reason in the world why we couldn't teach ops pukes (I was one so I can say that) how to properly perform maintenance. SACMET has recently cut 316X06 manning and I would endorse ops folks doing routine R&R type maintenance thereby releasing my 316X06 personnel for LF work.

Chief, Training Control Division: Carefully pick the tasks for items where we can get the most benefit from the least investment...all crews trained in all tasks. If we can do that, it has a very good chance of working. The decisions as to who inspects and evaluates should flow from two priorities: Do the job right (correct maintenance); Daily manageability of program...on a daily basis, ops should evaluate ops. Go for it!

Chief, Maintenance Support Division: May be a training and evaluation quagmire. Believe that Minuteman crews should be able to do the same troubleshooting and minor mx that Titan II crews could do.



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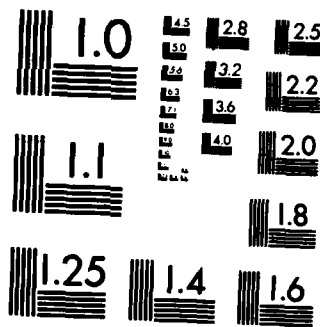
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FMMS Squadron Commander: I have been a Titan II MCCM and a Minuteman II MCCM, a 3901 SMES Evaluator, and an IB Ops Inspector...When I graduated from IBT I received a maintenance AFSC as a secondary AFSC, because back then the school was the same for everyone. Maintenance is NOT demeaning! MCCMs can do it - we all did it in the brown shoe days! Minuteman crew duty was boring - I would have welcomed the opportunity to do something where I could make a direct contribution to the everyday mission and see the results. This is a great idea - let the ops guys handle it!

OMMS Squadron Commander: ...As a current squadron commander I'd rather see ops put some more effort into letting my teams into the LCC...instead of demanding that we leave so they can sleep. Also, I'd prefer that MCCMs let my folks into the LFs sooner instead of making us wait. If you're looking for something to do, try to work on those ideas.

Assistant DCM: ...The secret is not to change ways of doing anything just because someone is doing something in addition to what they have done in the past. Simply apply standard tech data, regulations, training, and evaluation criteria that already exist and press on. More time is being wasted making simple things complicated! Try it - you might like it! Would provide good OER material beyond "He answers telephone when the lights light and the bells ring."...I started working this in 3901 SMES five years ago!!! DO IT!!

Flight Commander: Our jobs are very complex already. They encompass many areas in mxn already (LCC floor leveling, comm equipment troubleshooting, etc.). The mxn aspect of our job should be de-emphasized, not increased. On a typical alert, we do not have time to perform many simple tasks, like cleaning, & mxn tasks would spread us even thinner. DON'T DO IT. DON'T EVEN CONSIDER IT.

Flight Commander: Don't let crews do mxn. They have TOO much to do & learn now. There is only so much blood you can squeeze out of crew members.

Wing Command Post Emergency Actions Officer: Missile ops & missile mxn AFSCs should be integrated. All entries to missile career field enter thru mxn & progress to ops 2-4 yrs. Crossflows also. No missile crew member comes on line without prior missile mxn experience. This will give us a more mature crew force & mxn officers before they go on crew.

Flight Commander's Deputy: The myth of capsule crews watching TV, eating foil packs and getting fat while on alert is long gone. One has to consider the heavy mxn schedule which is required on an older missile system. Second, consider the heavy EAM traffic which requires both crew members to simultaneously decode 20-30 messages per 24-hour alert. Besides keeping proficient with the weapon system we must know the security regs & codes regs completely. Add to this the implied requirement to complete SOS by correspondence & acquire a Master's. Command personnel should remember that our primary job is to turn keys.

Staying proficient in the weapon system is difficult enough as indicated by crew Standboard results & monthly EMO, codes and weapon system tests. What should be considered is adding a THIRD CREW MEMBER to take care of all the communications equipment. My best advice would be to have staff personnel, from wing commander on down, pull 1 alert per month as a third crew member. The experience of a full alert would remind them of the pressures of crew duty. Given that, ideas like this would be squashed at the start. One final remark: If the job is so easy, why are people forced to crosstrain into this AFSC & why does Palace Missile & SAC refuse to release these people.

Flight Commander: I have over 36 months on crew, including DOV, DOT during a previous assignment. I feel that capsule crews should not have to perform mx. On a typical alert we process about 10-15 messages at an ACP this is very cumbersome & PLCCs (sic). Presently, we receive repeat transmissions of these messages over SACCS, SLFCS, AFSAT. All must be acknowledged. Additionally, we have numerous communications tests which we must acknowledge. Currently, even with the uncomfortable rest we receive after 24 hours in the capsule your alertness & ability to perform has been decreased. Instead of increasing combat crew responsibilities with the pressure & responsibility & increase (sic) communications we need a THIRD CREW MEMBER or return to 12-hour shifts.

DOTI Instructor MCCC: It has always been my concern, in a generated state of readiness that equipment or mx people may not arrive with the required drawers, radios, etc., to maintain 100% capabilities of an LCC. If at all feasible economically, at least the SCPs should have spare parts at their LCF to use if required. Using this concept even in a post-attack situation if for example an HF radio goes out, the crew will have one readily available.

Line MCCC: I can't believe this is even being considered. There is too much to do as it is now. It has never been more difficult to pull alerts as it is today. We are already responsible for EVERYTHING now and mx should be done by mx. What else are they going to want us to do? As it is now, people must be FORCED to take 18XX ops positions, & SAC still can't get enough and continues losing people every day. Tack on mx to the duties and you won't get anyone at all to do the job. It's a shame because the job is a very important one. But SAC has dug its own grave and is always bitter about losing people to BLCM or anywhere else. So it tries not to let anyone leave. Add mx to the burden and no one will be left to keep!

Flight Commander: Crews shouldn't be evaluated by DOV. No DOV interference should be allowed. I think performing maintenance is a good idea. Evaluation leads to tension placed on crewmembers. As a crewmember for 3 years I would enjoy the experience. I feel the time saved on down equipment would indicate the need for this program. The problem arises when DOV gets involved. The evaluation & training should be performed by maintenance personnel (experts). DOV personnel have a tendency to exaggerate what they see. Also, the maintenance to be performed should be directed through the appropriate maintenance branch.

DOTI Instructor MCCC: Any maintenance by capsule crews would be a special service. Therefore, crew members should not have the additional pressure of an evaluation on their backs.

Flight Commander: Crews would only need minimal training - if it amounted to any additional monthly training - we need more crew force to reduce the alert level- Also, only crews that volunteer to do maintenance are required to be trained. Also, crews that train in maintenance given 1st shot at cross-training to Missile Maintenance (31XX).

Job Control Senior Controller: Maintenance should be limited to drawers and nuts & bolts because more extensive maintenance would place too great a burden on training and the crews. It would also eliminate the need for follow-on inspections. ALL crews should be qualified to eliminate any confusion in maintenance or operations scheduling.

DOTI Instructor DMCCC: Capsule crews already face multiple tests & evaluations. By adding additional tasks you also increase the tests & evaluations. Free time is in short supply now. To increase training & evaluation to cover these additional tasks would further drop an already low morale. We don't need the extra headache.

Flight Commander: 1. No trouble-shooting should be allowed by MCCMs unless they are at least in telephone contact with qualified maintenance personnel.

2. R&R tasks should be specific and included in T.O. for crewmembers. No decisions should be made by MCCMs.

3. Crewmembers already perform many tasks that duplicate tasks performed by maintenance. For example, LCF Processor Shutdown and Startup, R&R Launch Control Panel & Launch Enable Control Group, drawer reseating, AFSATCOM & SLFCS trouble-shooting SLFCS Limited Startup, Manual Comm Monitoring.

4. Suggested other things that crews can perform: AFSATCOM BIT Test, ADJUST Modulation on UHF, R&R Launch Indication Panel.

Flight Commander: I think maintenance & operations should not mix. There's enough responsibility & enough work for any line, shop, or flight commander crew to do without more responsibility - without adding another dimension to an already frustrating job. With the added communications requirements already almost beyond most of us - Sometimes we think that we need a communications officer on board anyway - I think that to make MCCMs be maintenance-qualified would be the last straw. You'd have to DRAFT people into missile operations then. Not many volunteers now & look at the retention in 18XX career field now. People would want to leave this job in droves. Like I said, maintainers should perform maintenance in the LCCs; there's no need to re-invent the wheel.

Line MCCC: Minor maintenance in the LCC should be performed by the MCCMs. They understand more clearly how the situation occurred & should be trained on corrective actions.

Flight Commander: I have prior experience in Communications Maintenance. My experience was that operations personnel damaged & interfered with equipment more than they helped. "Simple" maintenance does NOT exist. Bent pins on the back of equipment drawers or failure to remove plugs etc., cannot be blamed on the operations crew ("it was like that when we got it") and leads to bickering between operations & maintenance. Maintenance people should do maintenance. If they need more people get them. Operations should not be burdened with more complexity in an already haphazardly-designed system.

Flight Commander: I have 3 years Titan (crew duty - 18XX). The fact that we did minor maintenance was no big deal. The important fact was, we had MAINTENANCE T.O.s to support us. Anybody can do it if they follow procedures. I strongly disagree with any maintenance function without the proper TECH DATA to cover that function.

Line DMCCC: Ops should stick with operations; maintenance should stick with maintenance. The pressure is great enough for operations personnel when SMES, 15AF, SAC IG are around. Mnx would then be subject to evaluation thus adding to the already constant pressure. I personally feel that we operations officers should devote our time to just being operations officers waiting for the Big Key Turn!

Line MCCC: Crew members at Whiteman are tasked with at least 8 alerts a month due to shortages of personnel. With increased alerts & comm systems, crew members have less time with families. Their workload is being steadily increased. Now with a maintenance task there will be even more training/evaluation days. Many time while on alert, crew members can be very busy due to increasing message traffic (due to AFSATCOM) or processing faults due to bad weather. If crew members are to be maintenance qualified, bonus payments should be given to crew members. This might alleviate personnel shortages in the 18XX career field - gear it like flight pay.

DOTM MPTD: Had two years as 1825 one year as 1835. I believe that MOST crews could perform minor maintenance in the LCC, given the alert tour was not very hectic. Some alerts would not give the crew time to perform maintenance, unless the LCC was shutdown, due to maintenance at the LFs, message traffic, etc.

Line MCCC: NO MORE EVALUATIONS! Check maintenance if done properly fine if not - ask why. Though I agree that MCCM could perform some maintenance - technical procedures should be left to maintenance personnel unless you send MCCMs to school.

Line MCCC: I feel that the requirements placed on the missile crews are already inhumane - let's not add to it!

Line MCCC: Crews should volunteer for maintenance training if there is a large minority who are not in favor of performing such tasks. Only experienced crews should be allowed to volunteer (i.e., on line crew for more than 6 months). Capsule crews SHOULD NOT BE EVALUATED on performing

maintenance tasks. If they are volunteers & are certified by a competent authority, they should be entrusted since they are actually helping the wing maintenance functions. The idea is excellent & feasible. It will save on down time & manhours...crews should not be involuntarily tasked with maintenance functions, as this would degrade quality control due to crew members with poor attitudes. Also, the crews should not be evaluated as this would cause discontent and would ruin the idea that capsule crews are helping out by volunteering.

Flight Commander's Deputy : I have prior maintenance experience with aircraft and I am familiar with the basics of equipment racks, and other maintenance procedures. Therefore I lean towards having MCCMs do minor maintenance & drawer swaps. A BIG DRAWBACK IS BEING EVALUATED on the actions, unless the evaluations are separate & if you fail a maintenance evaluation there should be no adverse effects except that you would not be qualified to do maintenance. Also if you were not susceptible to IG or 3901st SMES observations or evaluations of the task, just wing evaluations.

DOTI Instructor MCCC: While replacing drawers is a simple activity that MCCMs could perform, who will be troubleshooting to determine WHICH drawer is the problem? If a maintenance team must be dispatched to troubleshoot a problem, they may as well take any drawers that may be required with them. Will crew members be issued another T.O. to maintain or will the Operations T.O. be expanded? There should be clearly defined limits as to what a crewmember can & CAN'T do.

Chief, Standardization Evaluation Division (Lt. Col.): Capsule crews should not perform any maintenance than they are currently (sic). The increase in message traffic over the course of the years gives the capsule crews little or no free time to perform complicated maintenance functions. In addition, a Standardization/Training program would have to be considered in this area.

DOTI Instructor MCCC: The idea of missile combat crews performing maintenance at their own LCC may be a good one, except that there isn't usually time enough to do such maintenance on a day-to-day basis during alert... giving crewmembers another responsibility without proper authority/guidance (question 45) is a potential nightmare. I also personally feel that maintenance functions IN ADDITION to EWO, COMMAND & CONTROL, COMMUNICATIONS, SECURITY, AND FAULT MONITORING/COORDINATING MNX FUNCTIONS would be overwhelming to most 2-man crews. Training & evaluating maintenance tasks performed by MCCMs would be impossible under the current wing structure of DOV & DOTI. With increasing communications knowledge necessary, the missile combat crew effectiveness would be further reduced by introducing maintenance requirements. The ONLY way that I can see for MCCMs to perform maintenance at LCCs is to increase crew composition to 3 PERSONS, and/or expanding the instructor/evaluator branches at each wing by significant percentages, not to mention expanding Initial Qualification Training at Vandenberg AFB from 13 weeks to approximately 20 weeks.

Line DMCCC: The idea is one of unique efficiency. I don't feel that all crews should be qualified for maintenance tasking. As already intimated by your survey I feel select crews of known technical ability (COMMON SENSE) would be your likely candidates. I'm all for it for it's a way to reduce downtime & give crews maintenance experience for later career broadening. Maybe the crews would be designated by SMX (Squadron Mnx Crew).

Line MCCC: With the present & proposed comm equipment modifications in the LCC, we're almost becoming comm officers. In maintenance is thrown in, you're going to have "jacks of all trades & master of none". There is just so much you can expect people to do & remain proficient in their primary duties. If tasked with maintenance, initially the emphasis will be on training & evaluating those tasks at the expense of our primary duties. It already happened with the new SLFCS & AFSATCOM (C-cubed) procedures. Missile Operations has changes significantly in the last 2 years & I don't think people realize what we are doing down here.

Flight Commander, ex-Navy submarine crewman: I am totally against MCCMs performing maintenance. My crews have enough task coverage under less than ideal conditions. The C-cubed mod placed an additional burden on MCCMs. We should be reconsidering 24-hour alerts, concentrating on human factors such as reducing noise levels and NOT concerning ourselves with MCCMs performing maintenance.

Line MCCC: The ideal (sic) of capsule crews performing maintenance is OUTRAGEOUS! When was the last time you pulled an ALERT? My capsule is so full of equipment I can't get into the book cabinets without moving the bed, all that equipment means my work load has extended tremendously. Have you given a survey to pilots to see if they would perform maintenance on their planes? Please feel free to contact me. (signed, address, AUTOVON #)

Line MCCC: I think that it is absolutely RIDICULOUS to expect a 2-man Minutemen crew to perform maintenance tasks on top of everything else we're already responsible for! SOME training in this area, & only to be used in a real "pinch" might be OK - BUT it should NOT become part of normal training or EVALUATION - our primary mission is to remain ready to execute when directed - NOT play "grease monkey"! Current systems are already complex enough, without adding additional maintenance problems! (ie, we have enough to worry about, thank you!).

DOV Evaluator MCCC: Those who are considering adding this extra workload to missile operations have obviously not pulled alerts recently. Additional communications equipment has been added to the LCC, greatly increasing not only the alert workload, but the required technical knowledge & self-study required to generate same. Crew members frequently reach the saturation point now, then high volume message traffic with multiple retransmissions combines with heavy LF maintenance & common fault & power problems. Although there are occasionally "slow" alerts which would allow crew members time to perform maintenance, the



alert workload is NOT controlled by the crew. The additional workload requirements placed on DOTI/DOV/TTB/QC&E personnel would require additional manning in these areas, negating a significant portion of the manhours "saved" by maintenance personnel.

Line MCCC: It is a good idea, but with more & more training being accomplished by Vandenberg for initial training with lesser amounts of time, crews spend more time at the wings catching up just on the operations side. To drop maintenance in their lap would be terrible. But once they are situated then I think they should be trained in maintenance. Too many times has something malfunctioned & I could have fixed it without a maintenance team, but had to wait. It degrades the system & incapacitates a crew until it is fixed.

Airborne MCCC (4th ACCS): Fantastic idea, to allow crews to work on their own equipment. This will help the crewmembers learn more about their weapon system & take some pride in their workmanship. If this idea is implemented, keep DOT & DOV out of the loop because they are not as qualified to teach or evaluate as a TTB or QC&E team would be. I think some of our officers could learn a great deal from the enlisted troops on the maintenance side of the house. This idea should be put into effect at the earliest available date. (signed)

Line MCCC: NO WAY!! Quit trying to find some way of adding work & use what you now have. Most of the time maintenance crews are doing nothing anyway.

TTB Instructor: Good idea, it will save dispatch time and money and keep the crews from getting bored. With the crews only working on LCCs they would become proficient at it (sic), and notice simple problems easily.

ANCOIC Technical Engineering Branch: Should be limited to certain tasks. Minor maintenance and equipment drawer removal and replacement. I would not recommend they be qualified on Battery Charger checkout, for example.

Branch Chief, Quality Control Division: If capsule crews were allowed to perform maintenance, I believe that their emphasis would be to keep the overall system up without much concern for the individual components. This would cause additional work for maintenance personnel on the support base. It has been my experience with many officers associated with maintenance...that they tend to do things that they are not qualified to do because they think they understand the system...if capsule crews are going to perform maintenance...they need to attend technical training at ATC with follow-on training at the wing TTB.

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### Vita

Captain Charles L. Burdsal was born on 8 April 1950 in Fayetteville, North Carolina. He graduated from high school in Colorado Springs, Colorado, in 1968 and attended Colorado State University from which he received the degree of Bachelor of Arts in History in 1972. He enlisted in the Air Force and completed technical training as a SRAM Missile Electronic Equipment Technician in October 1973. He then was a technician and a supervisor (31672T) at the 288MW at Ellsworth AFB, South Dakota, until April 1978. He then served as a Technical Instructor at the Technical Training Center, Chanute AFB, Illinois, until March 1979 when he reported to Officer Training School. Upon being commissioned, he attended Minuteman Missile Combat Crew Member Initial Qualification Training at Vandenberg AFB, California, until graduation in September 1979. He served as a Missile Combat Crew Member and supplemental Missile Procedures Trainer Operator until entering the School of Systems and Logistics, Air Force Institute of Technology, in May 1983.

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This investigation determined the practicality of Minuteman Missile Combat Crew Members (MCCMs) performing maintenance in Minuteman Launch Control Centers (LCCs). The investigation was accomplished by an analysis of literature on MCCM maintenance performance, analysis of survey results, and analysis of maintenance data from the Minuteman wings. The survey solicited the attitudes and suggestions of Minuteman maintenance and operations personnel.

The survey results were stored on a data base system and cross-referenced by different categories to investigate specific hypotheses. A spreadsheet program determined category percentages and formatted tables. Hypotheses were supported or not supported based upon responses to specific survey questions by groups of respondents. The spreadsheet program was also used to compare and contrast the maintenance data from different Minuteman wings to determine the average annual number of maintenance actions that could be performed by MCCMs at each wing. The results of the survey responses and the maintenance data were used to determine the practicality of the idea.

The results indicate the performance of minor LCC maintenance by Minuteman MCCMs to be a practical use of manpower resources and suggests that the necessity for this utilization of MCCMs varies between the different Minuteman wings.

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